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business case for fleet
electrification

TOP TAKEAWAYS FROM
CONEXPO-CON/AGG 2023

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4 reasons skilled trades are more
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FROM THE EDITOR

KATHY WELLS



"A journey of a thousand miles begins with a single step," was the saying of ancient Chinese philosopher Lao Tzu. Whether you're applying this philosophy to the difficult week ahead or to the whole of your company's business operations, it's a good reminder that the fundamentals are key to long-term success.

With this principle in mind, we're covering finance from every angle. Beginning on page 16, "The Importance of Accounting Estimates in an Uncertain Economy" studies market volatility and offers tips for gaining control of your firm's finances.

Next up, on page 37, "Inside the 2023 Outlook for Equipment Acquisition & Financing" highlights key data from a recent study to help guide your equipment purchasing decisions and build a strategy for the future.

In "Turning New Construction Regulations Into Business Opportunities" on page 28, we'll give you three ways to use financial performance management technology to capitalize on Infrastructure Investment and Jobs Act funding.

And on page 30, "How to Use Legal Finance to Handle a Rise in Disputes" provides insights into construction litigation and how companies are funding the fees and expenses of pursuing litigation or arbitration claims and to accelerate or "monetize" expected awards.

With finance in mind, the Construction Business Owner (CBO) team will attend this year's Construction Financial Management Association (CFMA) Annual Conference & Exhibition, taking place in Aurora, Colorado, July 15-19, 2023. CFMA is dedicated to construction financial professionals and serves more than 9,000 members via 99 chapters throughout the United States and Canada. CFMA's annual conference provides attendees the opportunity to network with peers and discover new tools and innovative solutions. The conference will include networking events and education sessions following course tracks in accounting and finance, human resources, leadership and management, risk management, surety and technology. To keep up with CBO at CFMA next month, follow @CBOMagazine on Twitter for live conference coverage, business tips and exclusives from construction industry finance experts.

Take good care,

CONSTRUCTION BUSINESS OWNER

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FREE | June 22, 2023 | 1 p.m. CDT

CONSTRUCTION
BUSINESS OWNER
webinar

As a result of economic and cultural trends, construction organizations today are increasingly relying on technologies that increase efficiency — especially in accounting departments.

The value of financial technology in the construction industry may not have always been clear, but with skilled labor shortages and unreliable supply chains, it's time for construction firms to embrace all that technology can offer — especially in their back offices.

In this webinar, we'll review the trends causing the most pain and adding to the backlog for construction organizations, then dive into solutions that have helped more than 2,000 construction companies. Among other new advances in purchase-to-pay technology, we'll walk through the ability to retrieve invoices by email, optical character recognition (OCR), paperless invoice routing, lien waiver management, payment automation and more.

SPEAKER



Mike Carbino
Senior Product Director
AvidXchange

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► Antonio Nanni Elected President of American Concrete Institute



Antonio Nanni

The American Concrete Institute (ACI) announced Antonio Nanni has been elected to serve as president of the Institute for 2023-2024. Nanni, FACI, is professor and chair of the Department of Civil and

Architectural Engineering at the University of Miami. He has been an active member of many ACI committees and serves as a trustee for the ACI Foundation. He has been recognized by ACI for his many contributions with the 2021 Arthur J. Boase Award, 2018 Joe W. Kelly Award, 2006 Chapter Activities Award and 1999 Delmar L. Bloem Distinguished Service Award. He is currently site director of the National Science Foundation's Industry/University Cooperative Research Center for the Integration of Composites Into Infrastructure (CICI). Nanni has studied concrete and advanced composite-based systems as the principal investigator on several research projects sponsored by federal and state agencies and private industry. He has also contributed to field projects that have received awards from organizations such as the Florida Engineering Society (FES) and the International Concrete Repair Institute (ICRI). His research in materials and structures has impacted the development of guides, specifications and codes in the U.S. and abroad. Nanni is the editor-in-chief of the American Society of Civil Engineers' (ASCE) Journal of Materials in Civil Engineering (JMCE) and serves on the editorial board of other technical journals. Visit concrete.org.

► HCSS Partners With Diesel Laptops

HCSS, a software provider for heavy-civil construction businesses looking to streamline its operations, announced an integration with Diesel Laptops, an industry provider of vehicle and equipment efficiency solutions for diesel service facilities. HCSS Telematics and Equipment360 will combine with

Diesel Laptops' proprietary software to decrease equipment downtime and increase productivity for mechanics. HCSS Equipment360 and HCSS Telematics are tightly integrated. The telematics hardware connects with construction equipment to measure engine health. Fault codes are then sent to Equipment360, which generates repair work orders. With the Diesel Laptops integration, users will now be able to identify an equipment issue, get instructions on how to fix that issue, and instantly access lists of which parts they will need to fix the problem. The HCSS/Diesel Laptops coupling allows mechanics to work faster, finish repairs sooner and keep projects in projected timetables. Andy Turnbull, chief revenue officer at Diesel Laptops, said: "With a labor shortage in nearly every industry, it's more important than ever to get the job done right and get trucks back on the road. Joining forces with HCSS helps us to better address this disparity so our mutual customers can get greater results from less labor." Visit hcss.com and diesellaptops.com.

► CONEXPO-CON/AGG Adds Eric Sauvage as 2026 Show Chair



Eric Sauvage

CONEXPO-CON/AGG announced Link-Belt Excavator Company (LBX Company) President and CEO Eric Sauvage as the chair of the 2026 show, running March 3-7, 2026, in Las Vegas, Nevada. Sauvage has been an active participant in AEM leadership for many years as part of the association's boards and committees. A native of Paris, Sauvage became CEO of LBX Company in 2014 after joining the company in 2008. Before that, he spent more than 20 years with CNH Industrial and earned his U.S. citizenship in 2006. In addition to his role as chair of CONEXPO-CON/AGG 2026, he serves as vice chair of the Association of Equipment Manufacturers' (AEM) Construction Equipment Sector Board. Visit conexpoconagg.com.

Takeuchi-US Celebrates 1,000 Machines

On April 13, 2023, Takeuchi-US celebrated a significant milestone when the 1,000th compact track loader — a TL12R2 model — rolled off the assembly line at the manufacturer's facility in Moore, South Carolina. This 156,000-square-foot production facility, Takeuchi's first in North America, officially began assembling compact track loaders on Sept. 22, 2022. Visit takeuchi-us.com.

► Bentley Systems Announces Acquisition of EasyPower

Bentley Systems Incorporated, the infrastructure engineering software company, has acquired EasyPower, a developer of design and analysis software tools, including arc flash solutions, for electrical engineering professionals. Since its founding in 1984, EasyPower has combined graphics-based modeling and analysis in order to make solving complex electrical engineering problems ever more straightforward and accessible. EasyPower products are primarily used for designing, analyzing and monitoring power distribution systems serving industrial and commercial facilities, to ensure safety, reliability and regulatory compliance. Bentley's acquisition of EasyPower, to extend integrated and iterative power systems design and analysis for infrastructure digital twins of every type, broadens its comprehensiveness in infrastructure engineering. With an increasingly electrified future and with disparate and widely distributed energy resources on both sides of "the meter," all infrastructure assets will benefit — in performance, economics, safety and resilience — from continued simulation and assessment of power distribution conditions and designs over their project and operating life cycles. Priorities for Bentley Systems will include integrating EasyPower's schema and digital workflows with Bentley's OpenBuildings, OpenFlows, OpenPlant, OpenRail, and Bentley

Raceway and Cable Management applications. The acquisition of EasyPower initially adds 45 colleagues in North America. Visit easypower.com.

► The International Grooving & Grinding Association Announces Winner of First Concrete Pavement Longevity Award

The International Grooving & Grinding Association (IGGA) — a nonprofit trade association that is recognized as a technical resource in the development and marketing of optimized pavement surfaces and pavement preservation around the world — introduced the Pavement Longevity Award as a new addition to its annual association awards. The IGGA announced the 2023 award winner: Trunk Highway 210 (TH 210) in Minnesota. The award recognizes highway sections and owners each year for their exemplary efforts toward successfully building and maintaining roads for a service life that exceeds 50 years. The award showcases the importance of effective initial design and construction, as well as the importance of pavement preservation and maintenance, both of which contribute to a pavement section achieving its maximum life. Roadways and owners involved in the business of concrete pavement restoration/preservation at any level worldwide are eligible to receive the award, and each roadway nominated will be judged based on its age (which must be more than 50 years of service in the highway system) and its performance (defined as having the potential to maintain service for years to come with minimal concrete pavement repairs). Visit igga.net.

► AIA Software Names Bruce Kabalen to Lead Sales & Marketing



Bruce Kabalen

AIA Software LLC, developer of software and interfaces for heavy construction, named Bruce Kabalen, a crane industry veteran, to the newly created position of vice president sales and

marketing. Kabalen comes to AIA Software from Link-Belt Cranes, where he recently retired following a successful 25-year career with the company. Most recently, Kabalen was the manager of marketing and technical communications for Link-Belt. During his tenure, he was the driving force in creating the company's web-based customer portal, where he led efforts to create 3D parts pages and imagery while managing the technical publications group. Kabalen will apply his knowledge of the crane market to increasing market penetration for 3D Lift Plan, iCraneTrax, and related products. He will also oversee AIA Software's trade show, advertising and marketing planning. Visit aiaasoftware.com.

► ACPA Announces New Board Members & Steve Hoelsing as Association Chairman



Steve Hoelsing

The American Concrete Pipe Association (ACPA) announced the association's new chairman of the board and new members of board of directors, confirmed during the ACPA's Annual Convention held April 2-4, 2023. Steve Hoelsing, president of pipe, precast and prestress at County Materials, has been named the 116th chairman of the board and will serve a one-year term. Along with a new chairman, Hank Gottschalk, Concrete Pipe & Precast, and Dave Swenson, Eastern States Steel Corporation, have been named to the board of directors. As chairman of the board, Hoelsing leads the ACPA Executive Committee, which consists of five offices: secretary, treasurer, vice chair, chair and immediate past chair. In addition to being added to the board of directors, Gottschalk is taking on the role of secretary on the executive committee. This is Hoelsing's fourth year on the executive committee. ACPA members contribute to the improvement of the environment by producing quality concrete pipe, engineered to provide a lasting and economical solution to drainage and

pollution problems. For more information, visit concretepipe.org.

► Haver & Boecker Niagara Acquires Partial Ownership in Tandem Products Inc.

Haver & Boecker Niagara, a provider of screening and pelletizing technologies, has acquired partial ownership in Tandem Products Inc., a long-standing family-owned polyurethane producer of high-quality open cast screen media and liners for the mining, concrete, industrial and grain industries. Haver & Boecker Niagara's parent company, Haver & Boecker OHG, is a fifth-generation family-owned business with deep roots in industries such as mining, minerals, aggregates, cement, construction materials, fertilizers, salt and recycling. This joint venture is the result of many years of successful sales and production partnership between the two family-owned businesses and represents the mutual respect and core value alignment between the shareholders. The companies bring together a focus on high-quality products, innovative engineering and a unique customer solution-driven market approach. The combined worldwide sales channels and expansion of Haver & Boecker Niagara to a North American polyurethane manufacturer further support the OEM's business motivation and will benefit both companies' plans for growth. Tandem Products Inc. will continue to serve current and new customers with the well-known Rhino-Hyde brand, as well as with modular polyurethane screen media which will carry the Niagara brand. Niagara open cast polyurethane products have been manufactured at Haver & Boecker Niagara in Brazil for a number of years now, and this move rounds out the Niagara screen media brand for the mineral processing leader. Visit haverniagara.com.

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Insight from industry aces & answers to construction's biggest questions

ASK THE EXPERTS

What's the coolest piece of technology you've seen lately?



Ruben Valdez
Director of Business Development
BoxLock Inc.

// BoxLock is a supply chain access control platform. BoxLock's patented hardware-enabled software as a service solution provides operational control, inventory management and audit logging capabilities to leading construction, industrial distribution, transportation and warehousing companies, making their operations more efficient, accountable and reliable wherever assets are stored and transferred.

For construction applications, BoxLock's hardware (a physical padlock that is connected to our cloud platform via cellular chip) allows for real-time tracking and security for valuable assets. BoxLock integrates with platforms used by contractors daily including Procore, DeWalt Tool Connect, CribMaster and Hilti ON!Track.

Using the barcode scanner embedded in the padlock, users can control access to different areas on a site (job boxes, delivery boxes, tool storage, shipping containers, cages, gates, etc.) and understand when someone attempts to access these locked spaces and what assets are being removed or replenished.

BoxLock's Supply Chain Access Control Platform reduces the risks of losing materials on jobsites by offering a secure and reliable system for managing tools, assets and materials. By requiring authorized access through scanned barcodes, combined with active and passive tracking, the platform helps to ensure that only authorized personnel access materials.

As mentioned above, smart connected padlocks are equipped with a barcode scanner. This ensures access is restricted to authorized personnel only. These locks connect to our BoxLock Control software platform via either cellular or Wi-Fi connectivity to provide a chain of custody throughout the entire transfer process.

For contractors, the construction company on-site would share digital keys (dedicated QR codes) with contractors and subcontractors able to access the locks. These QR codes are shared through a text or email. Our software also allows you to deactivate the keys to those folks who are no longer working on-site. //



Eric Glasow
President
GCI Services Inc.

// The coolest piece of technology we've seen and are using is GCI Services Inc.'s interactive customer portal. This allows the customer to track their project in real time, and it takes the mystery out of what is happening or about to happen with their project. Only clients, workers, subs and design professionals who we grant permission to access it are allowed to log in and navigate the portal. One communication can reach everyone who has enabled that particular instant notification. This is super-efficient. No more picking up the phone and calling everyone to relay the info (or emailing, texting, etc.). Customers love it. They can alert us to things they see, changes, or simply follow the alerts and scheduling we share with them. It keeps them in the know and puts them at ease with the unknowns of the project. You can instantly update your customer or team member with pictures, invoices, change orders, schedule updates, videos, etc. They will receive either a text or email, or both if they desire. //

What's your take?

We want to hear from you!

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CONSTRUCTION
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ALERT
NEWSLETTER

Lower Your Margins or Win Higher-Margin Work?

How to set yourself apart in a sea of competitors



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.

■ How can you make any money competing against seven to 10 other construction companies for jobs awarded based solely on the lowest price?" This is a common frustration among contractors who aren't willing to take a hard look at their business model and determine what they must do to improve their bottom line. Working harder or bidding cheaper are not the answers. To improve, you must be willing to look in the mirror and decide to do things differently.

Are your current estimating, sales and customer development strategies viable to keep your company healthy, growing and highly profitable? Clients always ask me how they can win higher-margin work from customers who aren't just after the lowest price. Stuck contractors complain there are too many low-priced competitors to beat by price alone. But the stuck contractors are the ones who are also still holding on to the same poor business strategy, hoping things get better without changing.

I received the following email from a subcontractor: "The project owners and general contractors are in full control now. After the bids come in, they go to the generals or subcontractors to beat money out of them to lower the job cost. They work hard to squeeze every drop of blood out of subcontractors and suppliers. The No. 1 reason we hear is 'The project came in over budget, and we need to see

how much you can cut your price.' I know sometimes this is true, but now it's every project. What's worse is we're already bidding jobs at very low markups. If we cut our numbers more, we wouldn't make enough money to break even. If projects are really over budget, maybe they should tell the developer they need to increase their budgets or raise the rents!"

I sought solutions to these persistent challenges — here is one of the responses I received: "You can only exist in this economy. And the risk exposure is not worth the meager existence! And inflation eats up your 5% net profit before you finish the projects, with material and energy costs going up. Plus, the 10-day project payment schedule is nonexistent, and the domino effect eats your cash flow and reputation. I don't mean to sound doom and gloom, but is this the truth or what? This is not a great business environment to build a construction company in."

With this outlook on the future and unwillingness to make any changes in the way you do business, nothing will get better. At times, I am presented with yet another doomed approach to doing business today: "Lower your markup, win more work, keep your crews busy, and hopefully these lowball contractors who give things away will eventually go out of business." Waiting for others to change won't make it better.

Are You a Commodity Contractor?

Commodity construction work includes projects with open or unlimited bid lists, like most public agencies and general contractors that do not limit bidders and only award contracts based on the lowest price. Generally, project owners and builders who don't qualify or restrict contractors or subcontractors from bidding without strict prequalification requirements will award based on the lowest price per plans and specifications. Therefore, without stringent qualifications, the price is the only differentiating factor to award contracts. In other words, quality, performance record, financial capability, crew capacity, schedule, safety records or project requirements don't matter much.

Contractors who are unwilling to make the improvements required to build a highly profitable business continue to struggle and stay stuck at the same level. In comparison, a strategy to win higher-margin work is to seek new high-margin project types and customers who value expertise, strict qualifications, trusted relationships and experience. These best customer targets demand a high level of service, professionalism, design and technical capabilities, experience in difficult projects, or a proven track record in specific niche project types. For example, customers and projects with a high barrier to entry include medical, manufacturing, multistory buildings (versus individual offices), airports, shopping centers, warehouses, public roads and housing tracts.

Today's top construction business owners are creative — they're looking for innovative solutions to challenges and willing to change the way they do business. They know the same things that once worked won't work today. In order to prosper at higher margins, you must focus on what sets you apart from the competition, including providing added value, faster schedules, the latest

technology, proactive management, experienced supervision, personal service, and the ability to help customers succeed.

Do It Differently to Set Yourself Apart

What do you provide or perform that other contractors don't? If you're basically offering the same options as everyone else, you are a commodity. You must be willing and eager to illustrate the differences between you and your competition. If you don't take the necessary steps to differentiate your company, then you force customers to make decisions based on the lowest common denominator — price.

In the following response, you'll note this contractor understands what it takes to do business differently to make money:

"Unfortunately, selling price is common in many industries, including construction. There are ways to deal with this. First, set up a pre-proposal coordination meeting with customers where you get the opportunity to clarify their exact requirements prior to submitting a proposal. Often with bid documents, the customer's needs are incomplete or over-specified, which adds unnecessary costs to the price. Do your homework prior to submitting bids, and look for ways to improve, redesign, or value engineer the project with a goal to reduce costs or improve the schedule.

"Second, look for ways to retain your existing customers. If you sell to them once, then you should make sure they buy from you again on the next jobs without being the low bidder against too many competitors. Help customers meet their goals and make more money, satisfy their needs and build deep relationships to make it easy for them to choose you over your competitors the next time. Spend time with your customers and take them to lunch, a ballgame or a fishing trip. The more they know you, the more they trust you and want to do business with you."

Accept Responsibility for Your Margins

Accept responsibility for your future. Focus on solving customers' problems, providing an excellent product and delivering what's best for customers versus what's specified. This involves implementing a customer development program that plants you firmly in front of them, meeting often and asking what it takes to deliver exactly what they want. With an intelligent, caring conversation, you'll discover there are many alternative ways to work together to reduce scope or costs to achieve the same goals. And of course, look at how you choose the right jobs to bid, manage, track job costs and enforce productivity with your field crews.

Earn the Business to Win the Business

In my experience, the low bidder strategy only works as the means to an end. Finding new project targets or customers requires you to get your foot in the door. Since new customers don't know you yet, you can develop relationships by offering the lowest price. Try bidding low initially to buy a small job to prove yourself. Then it's up to you to impress them and convince them to use your services on future projects. Taking lower margins in a new customer relationship is not a bad idea if there's a legitimate chance this will lead to additional higher-margin work with a long-lasting and loyal relationship.

Unfortunately, there are no easy answers in the construction world today. If you're serious about moving your company upward with higher margins, stop bidding against too many competitors on open-bid list projects at low margins. Get focused on great projects with your perfect customers. Top business owners have turned their companies around by changing their business model and finding new ways to deliver products and services to customers. What have you done differently? ▲

The Foundations of Operational Excellence (Part 3 of 4)

How to create your company's ultimate process playbook



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

Operationally superior engineering and construction (E&C) firms continuously implement changes to processes and procedures to make sure they're operating at the highest level.

Creating an operationally superior E&C firm, whether you're a general contractor or a specialty trade contractor, takes diligence, continuous review and constant changes to processes and procedures.

Often companies that embark on such an undertaking end up with a manual or process document and feel like they can stop there. But doing that initial work is just the beginning.

In our first article about the best practices that define operationally superior organizations, we discussed preconstruction and the importance of reviewing processes, even when companies are profitable. In the second part in our series, we talked about best practices on jobsites or in the field to improve productivity, safety and customer satisfaction. Here we discuss how to make sure you're reviewing processes and procedures to improve and implement best practices.

Leveraging Processes for Continuous Improvement

One of the biggest mistakes companies make is relying too much on stodgy operational manuals, rich with processes

but light on depth and real solutions. For instance, there is an overreliance on checklists. You can't just follow a list to truly be operationally superior. You do need procedures to guide you, but you can't just check a box. Checklists are just one piece in the overarching process.

Processes are not perfunctory steps that can be pencil-whipped, but rather tipping points for real problem-solving.

Workers must be trained to see the checklists, steps and processes as prompts on what to examine and where to start questioning if the work will accomplish the goals. You have to put thought into where you are in the project and what needs to happen next to deliver a successful outcome. Every action has a reaction, and these steps within the checklist should be prompts to help managers and superintendents alike to proactively anticipate issues and challenges.

Consider the concept of the handoff meeting. How often have managers run through this checklist, knocking items off with relative ease? Plans — check. Specifications — check. Submittal — check. It can't just be about specifications or plans, but rather the intricacies of the plans, the challenges of the specifications and, ultimately, how the team will craft a winning strategy.



Best-in-class organizations understand the definitions of production, productivity and profitability. More importantly, they recognize that while there are some similarities, these three words are not equal.

Going through the motions is not enough. You need to think, ask questions and articulate solutions. Leaders need to hold workers accountable for thinking through the work.

Production is defined as total output. It doesn't consider the resources it takes to generate the outcome or product. For example, a crew installs 1,000 feet in a day. If 10 people were assigned to the job, this might be a high level of production — but it might not be the most efficient way to accomplish the work.

Productivity, the total output divided by the total input, measures how effectively a project is being completed. At some point you can have too many people on a jobsite, and their output suffers from lack of space or other resources. There may be a law of diminishing returns for having excess resources on a project.

That same pipe crew may be able to install 1,000 feet of pipe with only four workers, improving productivity and leaving workers available for another job.

Profitability is money made on a job, but that isn't always a direct result of better productivity. If a mistake is made in the estimation stage of a job, the actual crew doing the work may be productive, but the job still generates a loss. This speaks to a company's ability to manage a job from bid to completion. However, companies that fail to characterize the successful transitions from phase to phase can mask errors and ultimately fail to recognize where the true inefficiency lies.

Operationally superior organizations understand the difference among these three concepts and pay attention to all of them. They have different measures for success for each, maximizing their resources and making sure projects are profitable throughout the job cycle. Most importantly, they do not use them interchangeably or synonymously, but rather in a targeted fashion to describe superior performance.

There is an operational playbook that is used to manage projects. It guides them and provides structure but also allows for true project strategy.

Great companies have a playbook to provide the structure to make sure everyone is working in the same manner, and outcomes aren't left to chance or

individual preferences. Standard operating procedures or operations manuals are used to hold people accountable to how work is done and ensure consistent quality and outcomes. Most importantly, an operations manual must be viewed as a series of guardrails and guidelines, not optional practices.

We sometimes use the example of Starbucks to illustrate this concept. You can walk into any one of the more than 33,000 stores in 80 countries and get the same cup of coffee. It can be tweaked to individual preferences, but essentially, the product is the same because everyone understands the desired outcome and utilizes the same procedures. In construction terms, that is the difference between having 12 project managers working from their own playbooks versus following one standard procedure manual for jobs.

Any processes and procedures must be updated with regularity to ensure they are germane and applicable to new trends, niches, clients and workflow.

Once the operations manual is created and in use, it's time to review it. Many of our clients complete the implementation process and think that's the end. But

operationally superior organizations are constantly reviewing their processes and procedures to find ways to better serve clients, improve efficiencies and make sure they're finding productivity improvements. There is a continued evolution in process management that mirrors the applications on a smart device (1.0, 1.2, 1.3, etc.).

Monitoring Key Metrics

Earned value allows project managers to objectively measure project performance. For our contractors, we take into consideration the estimated units and hours versus the actual units and hours to determine if the project is on track or behind.

Productivity is monitored daily. The concept of earned value is the gold standard by which these contractors measure efficiency.

The advantage of earned value is that it focuses on the most important variables for project success, allowing project managers to quickly and accurately understand the current state without distractions and extraneous metrics. Ultimately, earned value gets to the heart of performance by charting efficiency and effectiveness.

The second critical advantage is that it's easy to show graphically and disseminate across the organization and the field in terms that are easy for everyone to understand. For example, telling a field supervisor he or she has \$20,000 of work to do may not resonate as much as articulating the work as having 2,000 feet of pipe to lay or 2,000 hours of install left.

Productivity performance is shared throughout the project team with the emphasis on controllable items such as productivity rates and earned value.

Operationally superior organizations focus on demystifying what is being measured and how people are held accountable for jobs. The entire team

needs to understand a few core metrics such as productivity and earned value. These are measured transparently and shared across the field and office teams. If nothing else, a little healthy competition — draped in safe performance — isn't a bad thing.

Project records are maintained with constant rigor and follow the firmwide policy or playbook to ensure precedence and consistency.

This might sound simple, but knowing where files are kept and having access to them ensures everyone can easily follow the processes and procedures you've worked to develop and implement.

Superior organizations have a level of standardization across teams so that projects can be quickly handed off and are easily understood by anyone.

This helps if there's turnover, and it is especially important for documenting large, complex projects.

The Discipline Is in the Details

Having standard processes and procedures needs to extend beyond the project level down to how you manage the details that go into each project. This includes equipment utilization and general conditions on jobsites.

Firms that use equipment — rented or owned — focus on utilization. Regardless of who owns the equipment, the usage is scrutinized, and if a piece is not being used, it is taken off rent to avoid excess charges and costs.

Part of process discipline is understanding why equipment is being used, how often and the business case for owning versus renting. Would upgrading or utilizing a different piece of technology reduce downtime? How often is equipment idle?

You need to have good utilization on jobsites, and when items aren't in use, they should be properly stored or leased to another contractor. Having discipline

managing equipment signifies a clear understanding of your processes and helps ensure productivity is maximized.

Empowering your employees to ask critical questions extends to this level of detail. Should a piece of equipment be owned or leased? Employees need to be empowered to think critically, continuously review usage and propose alternative management strategies.

Project general conditions are monitored and married to the overall schedule on a routine basis to ensure the burn rate matches the allotment.

Take stock of what is going on around the jobsite to make sure you're not eating into your margins by not diligently monitoring fixed costs.

For example, review your general conditions. Do you need two office trailers to complete the punch list? Could some of your people and equipment be utilized on another project more quickly to improve efficiency?

This is especially important for large projects that often get extended. It's easy to leave everything in place until the job is finished, but those costs could hinder your efficiency and erode margins.

Focus on Continuous Improvement

The easiest place to start on continuous process improvement is developing a playbook or standard set of practices. Once those have been implemented for a period of time, review and assess if they're working.

Empower your project managers, superintendents and field workers to think critically, ask questions and truly evaluate jobs for efficiencies and productivity. Reporting clear and easily comprehensible metrics will help everyone recognize where improvements can be made.

Operationally superior organizations are constantly evolving and adapting to changing conditions with clear goals and ways to measure progress. ▲

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The Importance of Accounting Estimates in an Uncertain Economy

Combating market volatility & gaining control of your firm's finances



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“A journey of a thousand miles begins with a single step,” was the saying of Lao Tzu, an ancient Chinese philosopher. Understanding this basic principle sheds light on the most fundamental element at the heart of every construction firm's finances: accounting estimates, specifically related to job costing.

These estimates provide management with a foundation to effectively interpret costs, profitability and bid processes. The constant monitoring of these various indicators will ultimately be what separates success from failure in a contract.

Under generally accepted accounting principles (GAAP), management is required to make estimates and assumptions that affect assets, liabilities and disclosures reported in the financial statements that have near-term exposure and from which actual results may be materially different.

Examples of such job cost estimates include takeoffs, labor hours, labor rates, material prices, equipment costs, subcontractor expenses and allocated indirect costs. Understanding the estimated costs to complete a contract is paramount in determining profitability. It is virtually impossible that initial estimates will be the same as the overall completed contract costs, thus necessitating the need for ongoing monitoring throughout the life cycle of the project.

Market Outlook

- Taking a deeper look at labor hours and rates, it makes sense to review the

most recent economic data surrounding construction employment to assist in understanding. Current data suggests record employment levels across both residential and nonresidential construction, with average year-over-year increases of approximately 3.4%, coupled with increased wages for production and nonsupervisory employees increasing approximately 6.1% over that same time period. Record demand coupled with pervasive worker shortages created a shift in overall power dynamics, significantly favoring workers. This caused a historic low level of layoffs and a higher-than-normal number of workers who quit. This overall shift caused wages to rise much faster than in other industries and elevated already-inflated construction costs.

- Material prices and input costs have continued to surge in the wake of post-pandemic supply chain constraints, an inflationary buying environment and increases in overall construction demand. Transportation-related issues including driver shortages and extreme weather events have led to continued supply chain issues, coupled with increased building demand, particularly in education, health care and research laboratories. Material prices for copper, aluminum and concrete were partially offset by a decrease in diesel, polyvinyl chloride (PVC) and lumber. Short supply items included transformers and appliances. Input costs have

At the time of this writing, breaking news regarding the second- and third-largest bank failures in U.S. history came to light and further heightened the volatility in the U.S. economy. The feeling of angst is more palpable than ever, and any premature celebration regarding a “soft landing” has been overshadowed.

risen at more than twice the rate of inflation since the beginning of the pandemic, causing constraint on overall profitability and requiring additional scrutiny on initial takeoffs.

- Demand continues, specifically in the multifamily sector (five or more units), with February multifamily housing starts increasing by 24% for the month compared to January, and 14% year-over-year. In furtherance of the industry’s optimism, multifamily permits rose 24% from January and 17% year-over-year. Overall permits rose 13.8%, and building starts increased 9.8% on an annualized basis. Levels are still lower than a year ago (approximately 18%) but represent solid growth in an industry that is so affected by market conditions. The uptick is reflective of rebounding homebuyer demand, coupled with overall builder confidence. However, recent events may dampen this momentum into the second quarter.

Translating this ever-changing data in an uncertain economy will ensure accountability on the part of both the project owner and the contractor, as well as spotlight when increased costs and overruns can equate to change orders. Using certain tools to manage these estimates can assist in uncovering issues before they have a harmful impact. One such tool is the monitoring of profit fade and gain on jobs while

utilizing trend analysis.

Taking a cross-section of similar-sized jobs over a three-to-five-year period will allow for a broader understanding of estimating capabilities and where adjustments may be needed. Conservative estimating starts from the onset, but the ability to pivot and adjust as jobs progress will ensure better estimating along the way.

Management Tools for Effective Estimates

Having proper, effective controls over estimating are necessary to ensure adequate documentation, clerical verification and required approvals at all levels of management.

To achieve this and avoid unreliable estimates that can obscure losses on contracts in their early stages, or overstate or understate profitability, management can undertake various actions.

- First, independent reviews of general contract cost estimates based on job specifications, plans and drawings against actual costs incurred will provide assurances that the estimates reflect all relevant costs. For example, review quantities of materials and hours of labor in bid estimates, and compare them to the overall specifications. Review material costs to published vendor price lists, price quotes or subcontractor bids.
- Second, verify the clerical accuracy

of final contract estimates — review the reasonableness of final estimates, ensuring that unnecessary or undocumented management-level adjustments are not arbitrarily made. Ensure proper review and approval by designated management personnel and that all revisions are properly supported.

- Third, understand general overhead and other indirect cost allocations applied to each contract, and constantly review for reasonableness against actual expenses incurred.

Further, consistency in estimating and accounting will allow for detailed comparison of actual to estimated costs at the completion of contracts. For example, accumulating historical competitor bids, if available, may provide evidence of reliable estimating. Conferences with project engineers and architects to review progress reports, field reports and project manager reports, as well as change order reviews — including unpriced and unsigned orders — will provide for substantive contract evaluation and administration.

At the time of this writing, breaking news regarding the second- and third-largest bank failures in U.S. history came to light and further heightened the volatility in the U.S. economy. The feeling of angst is more palpable than ever, and any premature celebration regarding a “soft landing” has been overshadowed. Managing through these times of record low unemployment, unprecedented consumer spending outpacing supply and high-profile layoffs in the tech sector point to uncertainty that appears likely to hang around. Combating this will require constant revision and review of accounting estimates to ensure a complete and accurate picture of results of operations. ▲

Does Your Contract Protect Your Company?

How rising construction costs lead to litigation issues

BY ROSE SURIANO & ROBYN LYM

There is uncertainty in the economy. Rising interest rates, shortage of labor, the war in Ukraine, post-pandemic catch-up in supply chains and other factors continue to cause costs of goods to rise.

The construction industry is not immune from the rising costs in supply chain goods and services; when the prices of goods and services increase, construction incurs delays and, under certain circumstances, results in a complete project shutdown.

How can the construction industry avoid disruption caused by unforeseen and unexpected price increases? The construction contract is the best means to control risk, such as rising costs, to allow projects to continue without interruption. There are several “protective” type clauses which provide protection when costs get out of control, post-contract formation.

An Escalator Clause: Calculating a Price Change

An escalator clause, also known as a price-adjustment clause, may permit

an increase of an already agreed-upon contract price. Although price is typically a key contract term determined prior to contract formation, an escalator clause is a contract term that permits an increase in pricing after the contract is signed. Escalator clauses are valid and enforceable if the language is clear and the method to calculate the increase is tied into an acceptable standard.

An effective escalator clause will specify how the price increase will be calculated and when it will be triggered. The price adjustment should be based on an objective or verifiable standard, such as an economic index, to calculate the price change.

In some cases, an escalator clause may even permit the parties to cancel the contract altogether, if the circumstances specified in the escalator clause are triggered.

A party entering into a contract with an escalator clause should carefully consider how a sudden or unexpected change in economic circumstance should be addressed. The clause may be crafted in such a way as to accommodate various

circumstances, as long as it is clear and specific. A clear and specific escalator clause is the most effective mechanism to address a cost change and to minimize additional costs arising from increased prices.

Proof is typically required to obtain the price increase in the escalator clause, including evidence of the cost at the time the contract was signed, the cost increase after the contract was signed, and the reasons for the price increase after the parties signed the contract.

In certain situations, litigation may be necessary if the performance of the contract would cause an unforeseen financial hardship and/or the contract parties cannot agree to modify the price or terminate the contract. Unclear language in the escalator clause or other contract provisions could also lead to litigation. Litigation may also be necessary if costs have already been expended to perform the contract or if there will be costs or losses if the contract is canceled.

A Force Majeure Clause: Modifying a Contract Without an Escalator Clause

A force majeure clause permits modifications to, or cancellation of, the contract after it is signed. This clause is typically contained in a contract and permits the modification or cancellation of a contract based on unforeseen circumstances, such as acts of God,

The construction industry is not immune from the rising costs in supply chain goods and services; when the price of goods and services increase, construction incurs delays and, under certain circumstances, results in a complete project shutdown.



natural disasters, acts of war or other unavoidable catastrophes. It is unlikely a force majeure clause will be triggered based solely on a price increase without other extenuating circumstances.

The Doctrines of Impossibility & Frustration of Purpose: Not Meeting the Contract's Obligations

In cases where it is impossible to perform the contract, or the purpose of performing the contract can no longer be effectuated, it can be argued that to perform the contract would not be impossible or the purpose of the contract is frustrated. A court may consider whether it is truly impossible to perform the contract, or if the purpose of the contract simply cannot be achieved even if the contract may be performed.

Under these circumstances, a party may not be required to meet its obligations under the contract. These doctrines usually consider events that were unforeseeable or unanticipated by the contracting parties.

The Remedies of Rescission & Reformation: Modifying or Canceling the Contract

If a contract does not contain an escalator or price adjustment clause and/or the contract's force majeure clause is inapplicable under the circumstances, other legal doctrines may permit the cancellation or modification of an executed contract.

Rescission terminates a contract, as if it had never been executed, and reformation allows a contract to be modified in order to reflect the parties' intent. These remedies are available in certain situations in which an unforeseen change in circumstances occurs that goes to the very heart of the purpose of the contract, and/or the parties do not intend to perform the contract under the new and unforeseen circumstances.

These remedies are difficult to obtain and require litigation.

Construction contracts are complex legal documents that require careful evaluation and consideration. Protective terms should be carefully considered

to protect against unforeseen risk and changed circumstance. Legal advice is often necessary to understand the risks and to ensure that your company is protected. ▲

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Mastering the Trade: The Value of Advanced Degrees

Challenging a fundamental misconception about grad students

BY ASHLEY JOHNSON, JOSH IORIO & ASHLEY WILLIAMSON

While many companies make substantial investments in targeting and hiring undergraduate students, fewer consider graduate students due to a fundamental misconception about applicants who hold advanced degrees. By understanding this misconception, construction industry recruiters can open an additional pipeline for talent in the industry.

The fundamental misconception is that all graduate students are the same. In reality, graduate students pursue advanced degrees for a number of reasons and have a variety of expectations related to salary, job roles and the added value they bring to an organization.

Some graduate students are interested in complementing their undergraduate degrees in construction with an advanced degree to learn specialized knowledge related to more complex project delivery methods (e.g., public-private partnerships), innovative means and methods (e.g., use of drones to

perform cut and fill measurements), or more advanced management topics that are not covered through their more general undergraduate degrees. These students may be interested in topics such as coordination of trades through the use of building information modeling (BIM) or automating site monitoring through the use of 360-degree cameras. Still, others are looking to transform the industry. They study cutting-edge research and are trained in the next generation of methods, processes, technology, and advanced applications in construction and design. For organizations committed to innovation and continuous improvement, new hires with graduate degrees are often a better fit compared to those with only undergraduate degrees, who may have a stronger fundamental knowledge of construction, but who lack a vision for the future of the industry.

Other graduate students pursue advanced degrees so they can change careers. Having already earned an undergraduate degree in a different area (e.g., business), some students pursue an

advanced degree to lay a foundation for entry into the industry. These students understand that you can effectively learn construction on-site through shadowing and learning by doing, but want to be familiar with construction terminology and concepts beforehand. These students often have substantial professional experience, much of which they learn to translate to construction through the graduate program.

Yet others seek graduate degrees because they've been working in the construction industry for a number of years, but they earned undergraduate degrees in a different field. In these cases, they seek a graduate degree in construction to better align their credentials with the work they're doing. They may have been told that they aren't eligible for promotion because they don't have a degree in construction. Graduate programs provide the transition point for professionals from other industries to enter construction.

We often hear recruiters claim that they don't consider graduate students,

For organizations committed to innovation and continuous improvement, new hires with graduate degrees are often a better fit compared to those with only undergraduate degrees, who may have a stronger fundamental knowledge of construction, but who lack a vision for the future of the industry.



because they assume that students will command a higher starting salary simply because they have an advanced degree. In some cases, the student may have developed a skill set that carries a higher value within the organization. In other cases, graduate students may expect a higher salary because they have years of construction industry experience and now have an educational credential that aligns with their experience. In both cases, a higher starting salary may be warranted.

But again, not all graduate students have the same salary expectations. Many graduate students understand that their advanced degree can potentially set them on a quicker path to promotion rather than resulting in a more advanced starting role (and salary) within an organization. They understand that the construction industry values real-world experience, and many accept that the investment in their degree will pay off in the long term rather than in the short term. Graduate-degree holders often

see the benefit of their degree when they climb the ranks in the organization, as many higher-level roles require an advanced degree. And while their peers will either pursue the advanced degree part time (or take time off work to pursue the degree full time), students who have already earned an advanced degree have an advantage in these cases. Organizations that consider applicants with advanced degrees also have an advantage because they don't lose productivity or compromise employee work-life balance by sending current employees back to graduate school while they're still working professionally.

The only way to determine the motivations and expectations of graduate students is to talk with them, include them in your recruitment plan and don't assume they're just more academically inclined undergraduates who expect higher pay with less experience. Graduate students, like their undergraduate counterparts, can add value to construction organizations if

they align well with the organization's goals. But in order to see that value, they can't be considered a homogeneous group with a single set of motivations and expectations. ▲

Ashley Johnson is an assistant professor of practice, chair of the construction engineering and management program, and associate director at Virginia Tech's Myers-Lawson School of Construction. Johnson teaches construction students and uses her experience as a project manager in the construction industry to motivate her teaching and advising.



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Ashley Williamson serves as the outreach and engagement coordinator for Myers-Lawson School of Construction. Williamson acts as the communications and marketing lead for the school and merges industry interests with student-focused events. Visit mlsoc.vt.edu.



Apprenticeship Programs Can't Do It Alone

3 observations from the National Center for Construction Education & Research about workforce development in America

BY TIM TAYLOR

The National Center for Construction Education & Research (NCCER) commends all apprentices currently training in the U.S. to become construction craft professionals. However, as the construction workforce ages, the industry is at a critical crossroads. The following are three additional observations.

1. Journeyman = Bachelor's Degree

It takes about the same amount of time for apprentices in the construction trades to reach journeyman level as it does for a college student to earn a bachelor's degree.

For example, it takes three to five years to become a journey-level pipefitter, four to five years to become an electrician and four years to become an ironworker. Likewise, an additional three to four years of training and testing is needed for a journeyman to become a master craftsman, much like the student pursuing a post-graduate degree.

Simple acknowledgement of this should increase the perceived value of choosing a career as a craft professional to parents, educators and others who influence a young person's career choices. Unfortunately, this information has not been widely presented, and therefore most people do not initially choose an apprenticeship path following high school. Another benefit that is not well

known: multiple pathways are available for individuals to advance to senior management. As shown in NCCER's interactive career pathways chart, apprenticeships provide similar career advancement opportunities to those with college degrees, and, in fact, more people in the construction industry go from an entry-level job to CEO or owner of their own company than any other industry.

2. Accounting for a 4-Year Lag

The average age of a construction apprentice in the U.S. is 29, while most undergraduate students are under the age of 25. That is an indication that it takes almost twice as long for individuals to decide to enter the construction trades and start their training.

Construction industry research over the years has shown that one of the prime drivers for this age disparity is that many individuals come to construction after first trying other career paths.

At age 18, when students are faced with the next step after high school, going into training in the construction trades is not often a first choice. Entering college, joining the military or even going straight to work with no specific post-secondary training causes a detour on an individual's path to the trades.

One reason is the lack of understanding about the overall labor market. According to the Bureau of

Labor Statistics, only 28% of future jobs are expected to require a four-year degree. In fact, industry research shows that for every 10 new jobs that are produced in the U.S., only one will require an advanced degree, two will need a bachelor's degree, but seven of the jobs will require a technical degree, apprenticeship or industry-recognized credential. It's also worth noting that the public is generally unaware of the average annual salaries for various journey-level craft professions.

A new tool released this year by NCCER is designed to shorten that lag. CareerStarter.byf.org is an online platform that brings together job seekers, educators and employers. The Career Exploration feature enables job seekers to find the right career through a personal interest quiz and helps them connect with nearby training programs and, ultimately, employers willing to hire them for entry-level job openings.

3. Expand the Apprenticeship Model

Work-based learning, including internships and co-ops, needs to be a more significant part of the U.S. education system. According to the U.S. Department of Labor (DOL), there were more than 593,000 apprentices registered with the Bureau of Apprenticeship and Training in 2021.



Of these, 197,421 participate in registered construction apprenticeship programs. This falls well short of the projected construction craft professional shortage of 1.9 million by 2025.

One of the reasons that there are not more “registered” apprenticeship programs is the amount of bureaucracy and the administration burdens imposed by the DOL, including rigid time requirements for classroom training that may not always coincide with project schedules or an individual’s competencies.

To support and expand the apprenticeship model, the following changes need to be made:

- Increase the number of DOL representatives to provide guidance for existing programs and assist in developing new ones at the U.S. state level.

- Incentivize companies and corporations to invest in their workforce by establishing apprenticeship training programs and/or hiring apprentices into their workforce.
- Factor in competency-based training into work-based learning. This provides apprentices the opportunity to receive program credit for demonstrated skills similar to advanced placement testing for university credit.
- Expand Title IV funding (Pell Grant, Perkins Bill) to apply to industry-recognized, accredited technical schools.
- Leverage governmental tax incentives to increase investment in career and technical education.

The goal now is to simplify the workforce development system in this

country to remove barriers and increase participation in all apprenticeship programs. In 2018, NCCER, along with other industry partners, released a three-year research document on this complex topic. NCCER recommended three short-term and four long-term policy changes that industry, education and government could tackle to make a difference. The research, advocacy document and slide presentation are available at nccer.org/news-research/research/rt335. ▲

Tim Taylor, P.E., Ph.D., is the director of research for the National Center for Construction Education and Research and a former chair professor of civil engineering at the University of Kentucky. His field experience comes from working in his family’s excavation company, in the coal industry as pit foreman and mine support engineer, and later as railroad superintendent for Luminant, Martin Lake Mine. His academic career includes many honors and awards and leading numerous construction industry research projects. Visit nccer.org.

CONEXPO-CON/AGG 2023

Top takeaways from North America's largest trade show

BY CARMEN CAPOCCIA

CONEXPO-CON/AGG 2023, the largest trade show in North America, took place March 14–18 in Las Vegas, Nevada. This year's installment exceeded expectations with a record-breaking 139,000 registered attendees (a 6% increase from 2020), more than 3 million net square feet of exhibits (10.5% larger than 2020) and 2,400 exhibitors from 36 countries — with 603 new exhibitors.

With thousands of exhibits sprawled across the desert, attendees had ample opportunities to see, hear and experience innovative new tech, machinery and products. David Press, government sales executive at GPS Insight, described the magnitude of the event: "It was 26 miles to walk the whole show!"

After the COVID-19 pandemic rocked the world and altered some exhibitors' CONEXPO 2020 plans, people were eager to gather again. Troy Dahlin, vice president of heavy construction U.S./Canada at Leica Geosystems, part of Hexagon, used the word "reconnect" to describe the 2023 show. "Over the last three years we've not had an opportunity to see a large number of customers — or even coworkers — in the same place at the same time. That human connection of talking with and learning from each other is the backbone of forming partnerships and relationships that lead to success."

Russell Young, chief business development officer at Tenna,



also highlighted the social experiences. "This year we had a huge and heavily trafficked booth, speaking spots at CONEXPO and the Association of Equipment Management Professionals (AEMP) among others, happy customers stopping by constantly, happy partners driving introductions to our booth, and we hosted multiple happy hours and parties."

The pandemic drastically altered the way many businesses operate, from remote work to automation to re-imagined business strategies. Skyjack Vice President of Marketing Malcolm Early says, "COVID-19 and the associated times presented our industry with some big challenges. The only thing that was certain was uncertainty. The largest lesson came from the effect on supply chains and the need for flexibility above all else."

Skyjack, a provider of access and material handling equipment, held a press conference about its increase in global capacity. "At Skyjack, we saw that we had to look to shorter supply chain structures and that meant increased manufacturing capacity, 'in the market for the market,'" explains Early. "Therefore, 2022 was a year where we increased manufacturing capacity with plants in China, Mexico and Europe."

Pandemic outcomes had unexpected benefits for Tenna as well. Young explains: "Surprisingly, the pandemic has had a positive effect. Modernizing equipment management went from a 'nice to have' to a 'need to have.' Paper and white-board driven management became much harder under new COVID-19 related conditions. Also, during the height of the pandemic, an increased reliance on and comfort with digital simplifications — such as QR codes and smart phone applications to replace paper systems — contributed to making Tenna an easier and more reliable investment to consider. In other words, the pandemic contributed to better ease of use and acceptance of technology to solve problems, and we reap the benefits of that progress."

As the construction industry looks toward the future, significant areas for growth have been pinpointed. Growing concerns about climate change and carbon emissions have increased sustainability measures. From electrification, hydrogen combustion engines and remanufacturing efforts, sustainability was on full display at the show. According to Early, "Sustainability is at the forefront of the conversation lately. With changing regulations and perceptions, sustainability has become a top-of-mind concern. The theme of sustainability is helping to shape many of the coming developments in the industry."



The labor shortage has taken a toll on the construction industry, and it weighed on attendees' minds. Young emphasized the topic's urgency: "Labor came up a few dozen times. 'How do we do more with fewer workers?' 'How do we attract more folks into our industry?'"

Dahlin also heard people talking about labor more than any other topic: "It's been a pain point for years and it's not going away. The lack of available bodies in this industry — and many

others — will continue to be a thorn in our side for quite a while."

As the industry grapples with labor issues, awareness of worker safety is gaining ground. The Centers for Disease Control and Prevention (CDC) reported that construction has one of the highest suicide rates, which is four times higher than the general population. Accordingly, mental health awareness has become a target issue. Young states: "Mental health is the responsibility of everyone. While I was volunteering at the AEMP booth at CONEXPO — as well as attending the satellite National Utility Contractors Association (NUCA) event earlier in the week — we talked about the stunning mental health data in our industry. Yes, we all look at the problems our specific companies solve in our industry every day, but it is also clear that we need to help our industry become cohesive to solve the big problems."

Young continues, "There is opportunity for our industry to be more cohesive: construction, original equipment manufacturers (OEM), tech and org all working to tackle these issues together for the benefit of everyone. The big moves in our industry that we are all tackling together, including mental health; renewable solutions; technology advances; diversity, equity and inclusion (DEI); etc., all take excellence in change management. We should not keep these best practices as secret sauce at each of our companies, but should share as broadly as possible so we can all get better together."

Dahlin adds: "Worker safety and retention are moving to the forefront of jobsite realities, to even include mental health. As it should be."

The construction industry continues to embrace new

CONEXPO-CON/AGG 2023 TREND WATCH

5 STRATEGIC SHIFTS GAINING MOMENTUM IN TODAY'S CONSTRUCTION INDUSTRY

1 RISE OF THE MACHINES

Multiple major manufacturers are bringing artificial intelligence (AI) and automation to the table with recent releases and updates, including: Bobcat's RogueX, a completely cab-less compact track loader designed for remote and autonomous operation; Teleo's technology built to retrofit existing heavy equipment into supervised autonomous machines (think robo-bulldozers and dump trucks); advancements to Honda's all-electric prototype, the Honda Autonomous Work Vehicle, leveraging the company's emerging advanced autonomous technology to create a rugged off-road work vehicle that is designed to support construction-related activities and enhance workforce productivity; and Develon's expanding Concept-X2 project, which combines information and communications technology and AI technologies on the jobsite, and features autonomous equipment that sends analyzed data to achieve accurate and fast work.

2 FOSSIL FUEL FREEDOM

As a wave of new energy alternatives becomes available, contractors have many new options, including electric vehicles, hydrogen cell technology and fossil-free steel production, along with hybrid pairings. Emerging leaders in hydrogen-powered construction include Volvo CE, Case, John Deere, Sany, Hyundai, Caterpillar, Develon, BOMAG and Bobcat, all of which have introduced one or more all-electric, battery-electric, and several hybrid equipment options to the market. Caterpillar featured four battery-electric machines as well as a series of prototype batteries for off-road equipment ranging from 48-600 volts. Volvo CE announced its EC230 electric excavator pilot, its Zeux autonomous concept wheel loader, and its HX04 prototype hydrogen articulated hauler. Volvo CE also brought the first construction machine made from fossil-free steel, produced by Swedish steel manufacturer SSAB that uses a completely new technology with fossil-free electricity and hydrogen. The result is a significantly lower climate impact in SSAB's production process — an at least 90% reduction in CO₂ emissions.

3 SUBSTANTIAL SUSTAINABILITY

As the industry embraces more sustainable technologies, products and practices, big names are backing the effort. From electric- and hydrogen-powered construction equipment, to more recyclable materials and waste reduction opportunities, sustainable strategies are now part of the bigger picture. Wirtgen Group and John Deere, a partnership now sporting the motto "Smart. Safe. Sustainable.," announced its intention to bring 20 electric models to market by 2026. Skyjack boasted its new SJ120 E, a zero-emissions mast lift. Terex, first to market with an all-electric utility truck reports approximately 60% of its current product offering is already electric or hybrid. Kubota showcased its V3307 Micro-Hybrid engine for installing in the company's existing equipment to help save on fuel. Volvo CE shared its goal to reduce its carbon impact and achieve net-zero value chain emissions by 2040. And CONEXPO-CON/AGG partnered with the Arbor Day Foundation and committed to planting more than 139,000 trees, one for every show registrant in a forest of greatest need.

4 MINDS ON AMERICA

Fueled by the country's continued focus on advancing the Infrastructure Investment and Jobs Act, manufacturers are stepping up their resources. Many major names announced intentions to amplify investments in roadbuilding product lines. And, in what seems to be an influx of focus from more international manufacturers, reinvestment or expansion in the North American territory has become a goal. There were several announcements from key manufacturers who have set intentions to bring more investment to manufacturing for the American market. Liebherr announced a U.S. expansion aimed at doubling capacity and innovation. In addition, Develon shared its intention to double the company's efforts in the U.S., noting that a North American presence is key.

5 STRATEGIC SAFETY

With a detailed focus on operator comfort and safety, many manufacturers are digging in on ergonomics, comfort, wellness and safety. Hyundai is driving a "comfort intelligence" strategy, touting a new identity and slogan focused on human-centered technology, "Building a comfortable tomorrow." In addition, Terex is supporting a zero-harm safety culture, pinpointing that technology is now the cornerstone in jobsite safety, crowning AI as the future of construction safety.

technology. Press explains, “The telematics industry continues to grow and become more specialized for the construction industry.” He continues, “I see the most growth for fleet-enabled onboard cameras or AI cameras. There are so many possibilities with this technology, and it just keeps getting better.”

Tech offers intriguing possibilities for automation, integration and workflow efficiency. Dahlin says, “As the industry grows and changes, so do the areas that are ripe for growth. Right now, we’re looking at definitive expansion in the areas of project and asset safety and utilizing reality capture to make real-time decisions. At the core of both areas is the continuing need for technology to continue to grow into the role of providing simple, total solutions to what customers need at any given time.”

He explains that issues involving workflow efficiency was the most common pain point brought to him by CONEXPO attendees: “What is desperately needed in order to improve workflow and save time and money is continuity between technology tools to create one seamless workflow. It’s that simple.”

Young didn’t mince words when he touched on tech’s growing importance for the industry, stating, “I am biased here, but the data and investment already tell the story that technology is the biggest advancement for construction in recent years. Equipment and labor only get you so far on their own — both hardware and software technology investments are now clearly separating the winners from the losers in our industry.”

As you plan to tackle construction challenges, monitor trends and adopt new tech, look ahead to March 3-7, 2026, when CONEXPO-CON/AGG 2026 will be held in Las Vegas, Nevada. ▲

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



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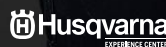
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Turning New Construction Regulations Into Business Opportunities

3 ways to use financial performance management technology to capitalize on IIJA funding

BY CHRIS PORTER

New legislation brings considerable impacts to the construction industry. One piece of legislation in particular, the Infrastructure Investment and Jobs Act (IIJA), a law enacted by Congress in November 2021, presents the largest long-term investment in infrastructure in U.S. history. The total investment of \$1.2 trillion is intended to provide spending across numerous infrastructure programs — from roads, bridges and railways to high-speed internet access and power infrastructure.

The IIJA presents an abundance of opportunities for construction companies, but not without its own share of new challenges and complexities. For example, the U.S. has traditionally hosted an attractive procurement market, but as competition (including foreign competition) increases to capitalize on these new opportunities, more pressure will be placed on domestic supply chains and the labor market in a time that is already experiencing high inflation and low unemployment. Additionally, as the IIJA falls under the Build America, Buy America Act, there are other considerations to take into account, such as tax implications, insurance risk and other policy criteria like the demand for sustainable materials. These factors are a lot to manage in addition to the current day-to-day issues construction companies already face.

To ensure businesses are well positioned for the opportunities

that the IIJA and similar regulations provide, finance executives at construction organizations need to invest in their own infrastructure first. This means adopting the advanced financial performance technology needed to best manage these projects for full vision into all aspects of their current business. Financial performance management technology enables construction companies to be ready for these new projects by empowering them to address the following considerations.

1. Cash Flow Forecasting & Cash Flow Management Are Critical

The IIJA and similar infrastructure funding will require finance executives at construction businesses to understand if they have the cash on hand to not only bid for these projects, but also to resource them correctly to account for the required labor and material costs. Strong cash flow planning and management are essential to ensure companies are equipped financially to handle the work upon winning the bid. To best manage this, they can consider and compare with similar projects they may have worked on previously and the type of cash flow needed then, and then use that data for current planning, addressing inflation and other external factors that may not have been previously encountered. Companies should



look into some of the tax credits available as well, which can also be figured into cash flow.

2. Scenario Planning Paints a More Comprehensive Picture

Scenario planning should be a significant consideration as it helps construction businesses plan for “what-if” situations as they look for federal projects being released for bids. Beyond having knowledge of the cash flow available, organizations need to consider their project backlogs from the pandemic or any other projects that may have been put on hold for various reasons, as well as their current ongoing projects, and take into account where potential new federal projects may impact their overall businesses. Having this full picture of existing projects will help ensure organizations are able to meet the collective needs of all, including public and private projects if appropriate. Again, this comprehensive view should address factors such as labor, materials and equipment.

3. Frequent Re-Forecasting Drives Successful Business Management

Once a construction organization wins an IIJA-funded project, there will still be a period of economic uncertainty for the

With government dollars on the line, companies at the center of IIJA projects will be held to a higher standard of accountability.

foreseeable future, from potential continued inflation to the ongoing labor shortage. And if or when the U.S. enters a recession, companies may need to start laying off employees. In the event of a workforce reduction, staffing will need to be taken into account from a project standpoint. (As readers of this article unfortunately well know, construction is typically one of the first industries to get hit during a recession, specifically for nonessential projects.) Being able to plan with confidence, including consistent re-forecasting, will help construction businesses better prepare for when those decisions must be made. This will not only help for a specific job but will also provide a better understanding of where costs and revenues will lie at the end of the quarter, at the end of the year — or on whatever frequency the business chooses to re-forecast.

In Closing

Many construction companies are still conducting their financial planning using spreadsheets. However, to be best prepared for work awarded from regulations-driven opportunities like the IIJA, deep insights and flexibility are critical, and that's not possible when planning with spreadsheets or pen and paper. What is needed is a financial performance management solution that provides the ability for construction businesses to understand and manage cash flow, produce what-if scenarios, and forecast and re-forecast. And that re-forecasting shouldn't necessarily just be every quarter, but potentially every month — even every week — to be best prepared for successful business outcomes, particularly in today's volatile economic climate.

With government dollars on the line, companies at the center of IIJA projects will be held to a higher standard of accountability. Having the right technology in place to fully manage the many complexities involved will help turn these regulatory projects into rewarding business opportunities. ▲

Chris Porter is director of construction solutions at Prophix. Porter is responsible for ensuring that construction organizations understand how a finance performance platform will help them to better manage projects by gaining a deeper understanding of their data and therefore make better business decisions. In his years with Prophix, he has consistently taken on a variety of roles and critical responsibilities, including consulting, sales and channel partner engagement. Porter is passionate about helping customers improve the pace of their business through the power of automation and analytics. Visit prophix.com.



How to Use Legal Finance to Handle a Rise in Disputes

Inside construction litigation & how companies are finding funds

BY CHRISTIANE DENIGER, JOE DURKIN & APOORVA PATEL

The construction industry has faced a number of challenges in recent years with the effects of COVID-19, record levels of inflation and the Russia-Ukraine conflict all having a knock-on impact on the sector.

Thus, it is hardly surprising that the industry accounts for a significant portion of disputes across major global arbitration centers. For example, in the latest reported figures for the International Court of Arbitration of the International Chamber of Commerce (ICC), 20% of the ICC's caseload came from the construction industry, driven largely by an increase in contractual and force majeure disputes. In addition, construction claims are becoming larger and more complex than ever before, with many involving damages well above \$50 million.

As construction projects and contracts are delayed or disrupted because of supply chain disturbances and commodity shortages, disputes within the sector are set to rise for several years. As a result, construction companies and contractors are increasingly relying on legal finance to fund the fees and expenses of pursuing litigation or arbitration claims and to accelerate or “monetize” expected awards.

North & Latin America: Increased Infrastructure Investment Will Result in Bigger Construction Disputes

The construction industry accounts for a growing proportion

of arbitration claims in North America; in 2022, construction disputes were 10% of the International Centre for Settlement of Investment Disputes' (ICSID) total caseload. As supply and demand for oil, gas and energy production ramp up, U.S. infrastructure will continue to pose a challenge. The significant level of investment needed will inevitably mean an increase in disputes related to infrastructure construction, particularly given ongoing global shortages and a challenging economy.

Similarly, Latin America, which has grown to be a major construction hub, is also expected to see a growth in construction and infrastructure disputes. Notably, the scale of projects in the region has rapidly increased; over the last few decades, several multibillion-dollar “giga projects” with regional contractors and foreign investors have been built in Brazil, Mexico, Chile and Panama. Latin America also continues to face difficulties following several years of recession, drops in commodity prices, labor shortages and delays in ongoing domestic and international projects due to union strikes.

Europe: War Continues to Have an Outsized Impact on the Construction Industry

European parties have seen the sharpest increase in the overall value of construction disputes. In 2021, the average value of European construction disputes was \$57.5 million, up from \$24.5 million in 2019.

European countries face many of the same issues seen in other geographies in addition to the current turbulence brought on by the Russia-Ukraine war. Before the conflict, Russia supplied up to 39% of the gas, 23% of oil imports and 46% of coal imports in the region. While reliance on Russian fossil fuel imports is decreasing, we can expect shortages to worsen in the region, leading to disruptions and turmoil for companies dependent on the success and completion of major projects. The problem has already begun to play out: The European Union (EU) expects construction output to shrink to 1.5% and 1.2% in 2023 and 2024.

MENA Region: Leading in Magnitude for Construction Disputes

The Middle East and North Africa (MENA) region is home to the world's largest infrastructure projects. Perhaps the highest profile of these is the infrastructure development undertaken by Qatar in the lead up to the World Cup 2022. Estimates of the cost of this project alone exceeded \$300 billion, including new hotels, roads, sewage systems, transport and stadiums that were built over an accelerated timeline.

Disputes are an inevitable outcome of so many high-value projects, and the significant disputes in the MENA region involve a range of jurisdictions and legal regimes comprising civil and Shariah law. The value of construction disputes in the region has increased exponentially in recent years to an average of \$90.4 million in 2021 — up from \$86 million in 2020 and \$62 million in 2019, with the highest value dispute valued around \$1 billion.

Legal Finance Provides Certainty to Construction Companies

The lack of certainty over the availability and cost of capital is a perennial problem for construction companies. To embark on large-scale construction projects that will take years to reach conclusion, contractors and companies typically rely on borrowing or partnering with larger players to obtain project capital. However, banks may deny loans or impose onerous covenants, and partnerships can go awry, exposing companies to further legal and economic risks.

This is why many companies in the sector are increasingly turning to legal finance as an alternative form of project financing. Given the sensitivity of these companies to disruptions to all parts of the supply chain, unfulfilled contractual obligations are common among construction companies. The prevalence of large-scale disputes therefore makes these companies good candidates for legal finance.

By leveraging their legal assets through legal finance, construction companies reduce the need for extensive counterparty credit or project operational risk assessment typically required when obtaining bank financing. Legal finance

provides an innovative source of capital that carries none of the economic risks and operational constraints associated with bank loans, inventory-backed financings or project partnerships.

Legal finance provides construction claimants with immediate capital to pursue their high value claims or to accelerate or “monetize” a portion of the expected damages for their pending matters. Capital is typically provided on a non-recourse basis, meaning that if the dispute is resolved unsuccessfully, the claimant owes no portion of the capital back to the legal finance provider.

Companies with multiple qualifying matters can also secure a large capital facility that pools these matters in a single funding vehicle. Capital provided via this type of portfolio financing structure may be used for virtually any business purpose. Thus, legal finance allows claimants to pursue high value disputes while continuing to operate their businesses, without drawing from their own cash resources. It adds certainty around budgets, either by removing the cost and duration risk associated with paying lawyers, or by “locking in” a minimum recovery in a monetization arrangement — or both, in scenarios in which a construction company finances a portfolio of matters.

Legal Financiers Can Provide the Expertise Needed in Major Construction Disputes

Given the inherent riskiness of construction disputes, claimants often benefit from partnering with a legal finance provider with deep expertise in bringing these types of claims. Finance providers can provide insights on a variety of aspects crucial to a successful outcome, including case strategy, counsel or arbitrator selection, budget consultation and judgment enforceability.

The construction industry is likely to face continued turbulence in coming years, and legal finance will serve as an essential risk management tool for parties in construction disputes. At a time when capital must be preserved for other business needs, legal finance can remove litigation or arbitration costs, conserve working capital, and unlock the value of pending legal assets. Given this, leaders in the construction sector are well served to build relationships with leading providers of legal finance. ▲

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4 Reasons Skilled Trades Are More Important Than Ever

Exploring the post-pandemic workforce & industry demand

BY MIKE JAHNER

The past three years have shown the world what many of us already knew: Skilled trade jobs directly and indirectly impact nearly every facet of American life.

It's nearly impossible to watch the news without hearing stories about jobs, the economy and the workforce in general. In our post-pandemic world, people across

multiple generations upset the apple cart when it came to the "great resignation." However, one thing has been clearer than the sunshine on a fresh spring day — skilled trades have emerged as an area of focus for not only business and political leaders, but for the individuals who are entering the workforce and making

decisions about their careers.

Let's take a closer look at what sets our industry apart and why skilled trades are more important than ever.

1. There is a growing demand for a skilled trade workforce.

According to ManpowerGroup, skilled



Only one in five students graduating from high school have indicated an interest in pursuing a skilled trade — causing alarm that is rippling through a variety of industries.

trades are the hardest positions to fill. In addition, a large number of skilled trade workers are nearing or at retirement age. This means there is a large gap in employment that will need to be filled on top of the gap that already exists today. Only one in five students graduating from high school have indicated an interest in pursuing a skilled trade — causing alarm that is rippling through a variety of industries. Today, the high demand for skilled trade workers means the opportunity for increased earnings, the ability to take advantage of flexibility that may not have previously existed in certain markets, and long-term job security as it's been proven that skilled trade positions are not going anywhere anytime soon.

2. The work is fulfilling.

Talk to the dedicated people who build

and solve problems with their hands every day, and they'll most likely tell you the work is fulfilling and gratifying. There is something uniquely rewarding about using your problem-solving skills and creating solutions in a real-life environment where you can experience direct results. Whether you're moving dirt on a jobsite, meticulously placing metal on an assembly line, or operating multimillion-dollar equipment to build homes and commercial buildings, the process of making something from nothing creates fulfillment that is difficult to replicate.

3. Opportunities for professional growth.

Whether individuals who enter the skilled trades arena are completing apprenticeships or joining larger programs and corporations, there is incredible opportunity for growth. Organizations are investing in their employees to grow their skills and create strong company cultures. They're also working to attract new, talented workers while progressing their existing workforce. Skilled trade workers can branch out on their own, operate their own businesses and obtain their own market share. Or, employees can climb corporate ladders and move into leadership roles, manage manufacturing teams and help train and educate the next generation.

4. There is a newfound appreciation for the skilled trade workforce.

If COVID-19 taught us anything, it's that nearly every aspect of American life is touched by the skilled trades.

The reality is, in many instances, that life must carry on. Our nation's skilled workforce continued to answer the call when it came to delivering supplies and products to grocery stores, transporting important materials and equipment to construction sites and keeping the power grid running across the country. The skilled trades sector has achieved such a heightened awareness that mainstream media and production agencies have highlighted the people who are making it all possible. For example, in partnership with 3M, filmmaker Julio Palacio and host Vivica A. Fox created a docuseries called "Skilled," which strives to fight the stigma sometimes associated with trade schools and skilled trades.

The bottom line is that skilled trades are crucial to our way of life, and the people who fill these positions make a profound impact on the communities around them. There is no doubt that blue-collar work has played an integral part in our nation's history, and the world has learned that it will also play an essential role in our future. ▲

Mike Jahner began his career at Bobcat nearly 20 years ago as a welder in the Gwinner, North Dakota, manufacturing facility. From there, he has served in various capacities including as an engineering prototype technician, a prototype shop supervisor, a product specialist specializing in remanufacturing within aftermarket parts, and most recently, he has spent four years in the training and development department with a focus on ensuring Bobcat's skilled trade employees have the training they need to be successful in their roles. He is currently leading safety and manufacturing training for Bobcat across North America. Visit bobcat.com.



What to Consider Before Converting Utility Fleets to Electric

Creating a road map & charting a course for electrification

BY STAFF WRITERS, THE UTILITY EXPO

The “greening” of U.S. utilities is underway. Here, greening refers to the process of transforming practices to be more environmentally conscious. The U.S. has committed to reducing greenhouse gas pollution by 50% to 52% from 2005 levels, and with electric utility production accounting for 25% of those emissions, utilities are under pressure to turn to cleaner sources of energy. Electrifying fleets is just another step in their overall plan to reduce the carbon footprint of their operations.

Southern California Edison (SCE), the primary electricity utility for much of Southern California, was recently recognized by the Smart Electric Power Alliance (SEPA) for its progress in transforming to a carbon-free electricity



sector and was named to the 2023 Utility Transformation Leaderboard.

SCE has already taken important steps to electrify a significant portion of its fleet, which contains more than 6,700 assets — approximately 5,000 vehicles, 1,000 trailers and 700 off-road assets.

Todd Carlson, SCE principal manager of fleet asset management, outlined the company’s ambitious goals. “SCE seeks

to lean into electrification opportunities and must be aggressive to meet proposed California air quality and greenhouse gas reduction goals associated with the proposed California Advanced Clean Fleet rule,” says Carlson. “SCE plans to have 90% of our light-duty vehicles electrified by the end of 2025, and 100% by 2030. That same year, we also expect to exceed 30% of our medium-duty and 10% of

our heavy-duty.” SCE’s electrification journey offers insights for your own fleet transformation.

Seek Assistance From Industry Groups

According to Carlson, SCE partnered with the other members of the Edison Electric Institute when developing initial public 2030 electric vehicle (EV) targets in 2020. “It was helpful to have an industry group assist in leading the initiative,” says Carlson. “Also, as a California fleet, we are active in commenting on proposals from our regulators who are attempting to address local air quality concerns.” Other resources on fleet electrification are available from the American Public Power Association and SEPA.

Create a Road Map

SCE used a telematics fleet assessment to

outline vehicles targeted to be replaced by EVs, where they park and how long they have to charge. This was used to calculate the charger size required at each facility by year.

“We collaborated with our facilities team on a construction plan to install the infrastructure and chargers needed for the next five to 15 years at each site,” says Carlson. Each site has its own project plan.

Consider Time & Budget Constraints for EV Charging Infrastructure

Infrastructure lead times and budgets are particularly important considerations. “Construction is costly, and you may need to cut concrete or asphalt across a parking lot or add a new panel or switchgear,” says Carlson.

In addition, SCE had to contend with a small number of sites that were circuit

constrained and required the utility to complete a circuit upgrade. Other conditions that required longer lead times include new to-the-meter service drops when switchgear is required.

EV infrastructure charging costs across 240 projects were recently published by ICF, a global advisory and technology services provider. This information can be useful in budgeting.

Tap Into Both Federal & State Incentives

Both federal and state incentives can help offset costs for electric vehicles and charging infrastructure. Refer to the U.S. Department of Energy website (energy.gov) for a list of incentives, laws and regulations, funding opportunities and other federal initiatives related to electric vehicles. SCE was able to tap into both sources for its electrification efforts.

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Prepare a Business Case for EVs

Beyond meeting air quality and carbon emission goals, a strong business case can help utilities build consensus and commitment to change.

At SCE, the business case for electric pickups and electric power takeoff (ePTO) bucket trucks is supported by the high cost of gasoline and diesel fuel in California. Expect lower maintenance costs to be part of the value proposition for electric vehicles. “Our EVs that replaced gas vehicles have very favorable maintenance outcomes,” says Carlson. “And our traditional hybrid vehicles have also had good maintenance outcomes over the last 10 years.” SCE expects similar results for newly delivered EV tractors replacing diesel units.

Take Driver Opinions Into Account

Carlson recommends surveying your

current drivers to assess if they are excited, neutral or opposed to replacing their fleet vehicle with an EV.

“Ask your drivers if they own an EV or if they have ever driven an EV for context as a starting point for organizational change management,” says Carlson. “The EVs often sell themselves because drivers like the quiet operation and reduced jobsite emissions.” According to Carlson, providing test or demo units to drivers often results in drivers asking, “When can I get one?”

Prepare for Expected Issues

According to Carlson, product availability is the biggest issue in the electrification of the fleet — and not just medium- and heavy-duty vehicles. “Even the exploding pickup truck space has been hit by availability and production constraints,” he says. Once SCE achieves full-scale

adoption of EV work trucks, portable chargers and robust public charging for storm support and emergencies will be required. However, Carlson doesn’t see portable charging solutions as a current constraint for EV work truck adoption.

There’s a lot to consider when electrifying your fleet, but because fleets like SCE’s are sharing how they plan to reach their goals, electrification is becoming easier, not only for all utilities, but also for their commercial customers. ▲

The Utility Expo is the largest event for utility professionals and construction contractors seeking comprehensive insights into the latest industry technologies, innovations and trends. The biennial trade show, known for equipment test drives and interactive product demonstrations, will be held in Louisville, Kentucky, Sept. 26-28, 2023. Visit theutilityexpo.com.



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Inside the 2023 Outlook for Equipment Acquisition & Financing

Key data to shape your decision-making

BY RALPH PETTA

Each year brings new challenges that construction businesses must navigate to be profitable and grow. The equipment-intensive nature of the construction industry increases the impact of interest rate increases, inflationary pressures and other volatile economic and market conditions. The Equipment Leasing and Finance Association (ELFA) and its affiliate, the Equipment Leasing & Finance Foundation (the Foundation), provide timely research and business intelligence that focus on equipment acquisition and its financing. In this article we will

examine key data and analysis to consider in your equipment acquisition strategy and decision-making this year.

Equipment Investment Forecast

Equipment and software investment has maintained steady growth since the onset of the pandemic, and it had a solid jump-off point at the start of 2023 due to booming growth in the second half of 2022. Annualized growth was nearly 12% in Q3, and estimated growth was 7.2% for the year overall. However, rising interest rates, inflation and broader economic

uncertainty are likely to continue to slow the pace of investment growth this year. According to the Foundation's 2023 Equipment Leasing & Finance U.S. Economic Outlook, the forecast for equipment and software investment growth is 4.2%, with sluggish GDP growth of 0.9%.

Recession Watch

While elevated concerns of an imminent recession loomed over the past year, it has yet to come to fruition; the labor market remains strong, and consumers have held firm despite high inflation. In addition, supply chain backlogs have largely been resolved and have returned to their historical norms.

However, the strong labor market is making the Federal Reserve's efforts to lower inflation more difficult. The Fed has also been shrinking its balance sheet, and this quantitative tightening will contribute to constrained financial conditions, even if rate hikes slow or pause during the year. Tighter monetary policy will make

it more difficult for businesses to expand as the higher cost of borrowing is likely to result in further reductions to capital expenditure (capex) plans. Indeed, one of the most reliable predictors of recession in previous business cycles has been the paring back in capex plans by small businesses.

Elsewhere, the housing market is struggling, financial markets are highly volatile and the global economy is slowing. While still hoping for signs of a “soft landing,” the Foundation’s 2023 Economic Outlook and numerous economists forecast that the most likely outcome is a mild recession beginning later in 2023.

Equipment Investment Activity

Despite equipment and software investment traditionally decreasing three to five times more than GDP during a recession, there is optimism

that equipment investment will outperform GDP this year. A significant backlog of equipment demand in many equipment verticals, and passage of the Infrastructure Investment and Jobs Act and the CHIPS Act, should provide significant boosts to the manufacturing sector and equipment verticals.

The Foundation-Keybridge U.S. Equipment & Software Investment Momentum Monitor identifies turning points in the investment cycles of 12 key equipment investment verticals. The March release shows two verticals are expanding, two verticals are peaking, one is recovering and seven, including construction, are weakening. Investment in construction machinery grew 45% (annualized) in Q4 2022 and was 27% above its level from last year.

The March Momentum Monitor indicates that construction machinery

investment growth may have peaked and could start to decelerate into Q3 2023.

Equipment Finance Activity

The Fed’s actions to combat inflation through continuing interest rate hikes have not yet significantly impacted equipment finance activity. Nearly eight in 10 U.S. businesses use equipment leasing and financing to acquire the productive assets they need to operate and grow. More than half (55%) of equipment acquisitions are forecast to be financed with protection from equipment obsolescence, tax advantages and cash flow optimization as the top drivers for end users to finance. Favorable legislation emanating from Washington, D.C., equipment order backlogs and reshoring trends, as well as the many benefits of financing for end users, may make the looming downturn less severe

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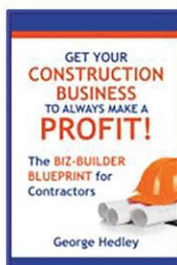
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for the equipment finance industry. ELFA's Monthly Leasing and Finance Index, which reports economic activity from 25 companies representing a cross section of the \$1 trillion equipment finance sector, showed that cumulative new business volume in February 2023 was up 11% from February 2022, and up nearly 9% year to date from 2022.

Additional Factors to Consider

To help businesses with their equipment acquisition planning, each year ELFA forecasts the top 10 equipment acquisition trends. In addition to the trending conditions affecting economic growth, capital spending and tightening credit noted above, the following are issues to keep an eye on over the coming year.

- **Offsetting labor costs** — To reduce dependence on labor, businesses in some industries will increase

their use of automation and other labor-saving equipment.

- **Equipment investment** — Many equipment types will thrive amid a slow-growth economy, including hybrid work-related types such as computers, software, office equipment and communications equipment, in addition to medical equipment.
- **Climate financing** — Explosive growth in green projects will drive demand for "climate financing" for equipment by organizations that are committed to cutting their production and emissions of greenhouse gases.
- **Wild cards** — Businesses will keep an eye on other areas such as a potential debt-ceiling showdown in Congress and energy price increases due to Russia's war on Ukraine.

Staying on top of the latest business intelligence is key to your business operations. The Foundation's Equipment Leasing & Finance U.S. Economic Outlook is updated quarterly, and both the Foundation and ELFA release regular statistical and topical reports throughout the year. Visit ELFA's Knowledge Hub, an online library of industry research and information for the equipment finance industry to learn more: elfaonline.org/knowledgehub. ▲

Ralph Petta is the president and CEO of the Equipment Leasing and Finance Association (ELFA), the trade association that represents companies in the \$1 trillion equipment finance sector, which includes financial services companies and manufacturers engaged in financing capital goods. ELFA has equipped businesses for success for more than 60 years. Visit equipmentfinanceadvantage.org.



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Staying on Top of Equipment Maintenance & Inspections

How outsourcing preventive maintenance programs can relieve burdens & increase productivity

BY BRET KASUBKE

As worksites become more complex, and machinery continues to evolve, companies face challenges with equipment ready to perform when needed. There is a vital safety, productivity and financial case for contractors to conduct regular maintenance and inspections that help keep their equipment operating at high levels, so project schedules and budgets stay on track.

Some contractors under-maintain their equipment, especially high-use compact to midsize machinery such as aerial work platforms, backhoes, generators, light towers, mini-excavators, pumps, skid

steers and more. This can happen because these companies do not have the needed technicians, they are not able to keep track of maintenance schedules, or they are too busy completing projects to pull machines out of use. However, failing to conduct fleet maintenance and required inspections comes at a price that includes higher costs, lost productivity and increased safety risk.

As contractors look to extract maximum value from their fleets, an equipment rental provider can be a valuable partner in keeping owned equipment on their worksites in top operating condition.

A rental provider can customize a maintenance and inspection program to proactively handle contractor needs. The programs help companies protect their investment, safeguard employees and meet regulatory requirements.

A Look at Safety, Productivity & Financial Benefits

Listed below are some of the critical safety, productivity and financial benefits of preventive maintenance programs and regular inspections for construction companies.

Safety Benefits

Over time, wear and tear on equipment can lead to potentially dangerous mechanical failures. Worn chains and cables, broken pedals or levers, and malfunctioning safety lights or audio signals can cause worksite accidents. Creating and following an equipment maintenance plan can mitigate serious hazards that result from faulty equipment and improve overall worksite safety.

Equipment inspections required by the American National Standards Institute (ANSI), Occupational Safety and Health

Administration (OSHA) and Canadian Standards Association (CSA) are equally important. For example, aerial lifts, such as boom and scissor lifts, require inspection by qualified mechanics or technicians every three months or every 150 hours, whichever comes first. Aerial lifts must also be inspected annually — every 13 months — and every time the equipment has been out of service for over three months.

It is important to note only a mechanic or technician qualified to work on the specific make and model of the aerial lift can perform the lift inspection. If this company does not have this expertise available in-house, it should consider outsourcing equipment inspections to a qualified vendor.

Productivity Benefits

Poorly maintained equipment is more likely to break down when it is needed. Companies that follow a preventive maintenance schedule experience less unplanned equipment downtime and better performance, resulting in greater productivity. Inspecting equipment during regular preventive maintenance service can reduce the risk of potentially crippling issues.

Financial Benefits

Proper maintenance and inspection of equipment can save a company money in numerous ways, including:

- *Reducing downtime* — When equipment fails, the costs of lost productivity and wasted wages can be considerable. Preventive maintenance and regular inspections help minimize failures.
- *Avoiding fines* — Failure to perform aerial work platform inspections or inspect other equipment, such as cranes and derricks, on schedule can result in government fines.
- *Lowering repair costs* — A well-executed preventive maintenance program can reduce repair costs compared to relying on reactive maintenance, or waiting until a machine breaks to fix it. The simplest maintenance tasks can prevent expensive engine breakdowns.
- *Reducing overtime* — If equipment breaks during a project with a tight schedule, a company may have to pay workers overtime to make the scheduled deadline.
- *Extending the useful life of the equipment* — Well-maintained equipment lasts longer. When regular fleet maintenance is performed, companies can delay purchasing new equipment.

Outsourcing Maintenance

Starting and sticking to a preventive maintenance program can be challenging, especially when equipment moves between jobsites. Outsourcing can be an attractive option for companies that want to gain the benefits of preventive maintenance and inspections but need more internal capabilities or resources.

Contractors can look for an equipment rental provider that offers a dependable one-stop shop with standardized processes and rates that takes the maintenance and repair burden off fleet owners. Outsourcing these tasks to a single vendor with deep experience in equipment maintenance and a large staff of skilled technicians can relieve the burden of fleet maintenance and let companies focus on what they do best. This approach can give companies peace of mind, knowing equipment will be ready to perform when needed.

Delivering More Value

For too many companies, preventive maintenance tasks and inspections fall through the cracks of busy work schedules and equipment moving from worksite to worksite. A well-executed maintenance and inspection program delivers great value by ensuring equipment is ready to go.

These programs add structure and visibility to the maintenance of owned equipment so companies can reduce downtime and improve cost control. They protect equipment investment and extend machinery life, reducing the risk of catastrophic equipment failure that can lead to worksite safety issues. ▲

Bret Kasubke is director, customer equipment solutions at United Rentals. He has 20-plus years of experience driving performance improvement. From on-demand service for unexpected construction equipment repair to a turnkey fleet management solution, United Rentals' customer equipment solutions team has an option that can be catered to a company's unique needs. Visit unitedrentals.com.





What Can Construction Learn From Netflix?

Exploring the rise of a tech giant & its lessons for business owners

BY LUCAS MARSHALL

Netflix is a company many of us wanted to root for — America loves an underdog story.

In the age when video rentals ruled supreme, Blockbuster was the Goliath to Netflix's David. Its executives reportedly laughed at Netflix when the struggling company propositioned Blockbuster to buy it outright for \$50 million. Such a decision was likely regretted. With CEO John F. Antioco pushed out, replacement

John Keyes was dealt insurmountable debt and the looming Great Recession, a deadly combination which ultimately led to Blockbuster crumbling like a detonated skyscraper, while Netflix rose like a weed from the rubble of the vanquished giant.

Netflix was precisely the scrappy ragtag startup the entertainment industry needed to disrupt tired technologies with innovative breakthroughs, and agile enough to stay ahead of its competitors in a crowded space.

But Netflix has seen strong headwinds. Film critic and historian Jason Bailey pondered whether Netflix is in its Blockbuster era in an NBC News article, pointing to “a variety of unpopular decisions” that “threaten to turn the streaming service into the bad guy it once dethroned.”

So, what can technologists, construction owners and C-suites take away from Netflix's recent pitfalls?

The Fate of Financial Markets Looming: 2008 vs. 2022

Netflix is part of a phenomenon in the tech industry that has seen sweeping layoffs through 2022 and 2023 and has even spurred an interactive tracker,

layoffs.fyi, that chronicles the widespread job cuts across the tech sector. For reference, Netflix laid off 300 employees in 2022 (adding to a previous purge of 150 staffers).

How does this compare to the financial meltdown of 2008? Well, unlike 2008, the layoffs we're seeing in tech seem to be isolated to tech, in part due to hubris.

Let me explain. Big tech was hit with a surge of demand unexpectedly brought on by the pandemic, but companies grew excessively to meet the new demand at a rate that outpaced their actual needs. For reference, Netflix grew its headcount 42.78% within the same period.

What Business Owners Can Learn From Big Tech's Hubris

- *Private corporation vs. initial public offering (IPO)* — The “tedious and costly task of an IPO, the founders having to give up total control and the need for more stringent reporting to comply with SEC rules” rank among Investopedia's reasons why companies would choose not to go public. In a real-world example, Investopedia points out how Snap Inc. was sued by investors after its IPO performed

poorly, claiming “the company had made ‘materially false and misleading’ statements regarding user growth.” A similar predicament is explored in HBO comedy “Silicon Valley,” where a fictional CEO, worried about not living up to the unrealistic financial benchmarks of an IPO, wonders if “negotiating [VC firms] down” might serve a better way to achieve realistic key performance indicators (KPIs). While amusing, it raises an interesting point — companies seeking financial backing should be conservative and iron down an agreement that is realistic for both parties.

- *Growing at a reasonable rate* — Unlike some of its peers, Apple grew at a reasonable 20% rate (reasonable for a trillion-dollar company), and was able to skirt the big tech layoffs. Apple is facing its own headwinds, but its realistic growth rate has set it to better weather short-term headwinds. Further, CEO Tim Cook demonstrated leadership when he took a 40% pay cut to help stave off layoffs. Jeffrey Pfeffer, a Stanford business professor, told Stanford News of a similar story at Lincoln Electric, where the company avoided laying off 10% of its workforce, instead cutting pay across the board by 10%, except senior management (who took a larger cut).

Unlike the tech industry, construction overall was up 27% in January, with more jobs than companies can fill and wages up 6.2%, outpacing overall job and salary growth in other sectors.

As owners look to hire for hard-to-fill roles, we recommend looking to Silicon Valley’s reckoning as a warning, and focusing on building a culture that attracts talent rather than excessive pay packages. For example, a Jobvite survey showed 32% of candidates stated they would be willing to take a 10% pay cut if the company they were looking to join was a good cultural fit.

Straying From the Unique Selling Proposition

Netflix’s early days defined its unique selling proposition (USP):

- No late fees
- A huge selection on an “all-you-can-eat” business model
- Betting big on digital (future technology)

Setting the record straight, the 2020 documentary “The Last Blockbuster” explains that Netflix didn’t kill Blockbuster. In fact, Blockbuster fired back at Netflix, launching a “no late fees” policy and had a growing digital business that was backed by physical stores that made returning rentals locally a snap. But Netflix had capital when neither Blockbuster nor Netflix could predict a financial meltdown.

Today, Netflix sees increased competition while it strays from its USP:

- Moving away from its licensing deals to its own original content, perhaps seeing the writing on the wall, a development out of its control.
- Focusing on big-budget series, which can be financially risky.
- There’s something to be said about quality over quantity, yet Netflix’s tendency to greenlight shows has been lampooned, and the company has canceled popular shows — some before they can reach their potential (often after just one season) — which has led to a phenomenon Forbes calls “a cancellation loop.” It also risks other streamers picking up its canceled shows.
- Netflix recently announced an ad-supported plan, which has limitations and has been mostly panned. Furthermore, an incoming password sharing crackdown walks back a previous stance by CEO Reed Hastings that seemed to condone the practice.
- A history of price hikes — resulting in its premium-tier growing to \$19.99

over the years — makes canceling the service an easy choice for consumers as the company repeatedly cancels their favorite shows.

All this to say, Netflix maintains its dominance over the streaming wars, but its subscriber growth may be plateauing as competitors grow at a faster rate.

As for the passwords, ultimatums can hurt a relationship, so forcing one on loyal customers seems doomed to backfire.

If Blockbuster’s example is any warning, these business decisions are problematic to say the least.

Integration, Not Isolation

TV companies have come together and consolidated, leaving Netflix in the cold.

In construction, experts agree that integration over standalone software is key to connect critical workflows.

Bottom Line

Don’t get me wrong — I love Netflix. I’ve been a loyal customer for 10 years. I’m rooting for them to persevere.

Bad decisions made as the company is being disrupted could lead to its Blockbuster era.

As construction owners look to learn from Netflix’s mistakes, I recommend focusing on improving the customer experience; leading through data and integration to streamline jobsite workflows, automate manual entry, and drive insights; and finally, like the early Netflix, adopt technology such as smart tools and automation to help you stay ahead of your competitors and drive better outcomes for customers. ▲

Lucas Marshall is manager of content marketing and SEO for Milwaukee Tool, where he and his team raise awareness about the company’s software as a service (SaaS) platform, ONE-KEY, and educate its users on inventory best practices. Visit milwaukeeetool.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.



TOPCON

Digital Layout software

Released: 4/20/23

Availability: U.S., European, Middle Eastern & African markets

What's new? Software enables more contractors to adopt a digital layout workflow for increased efficiency, accuracy and productivity. Designed to help both first-time and experienced users of digital layout technology, this cost-efficient building construction field software works in combination with a 3D laser — the Topcon LN — or a Topcon GT robotic total station, providing a step-by-step guide to streamline routines and workflows.

Specs: The software can be used with the Point Manager plug-in for Autodesk Revit or AutoCAD to create point files in the office and transfer as-built data back to a contractor's design software. It is compatible with 2D, 3D and building information modeling (BIM) workflows, and is supported by Microsoft Windows and Android operating systems. Users can generate real-time PDF reports to summarize work progress for stakeholders. Topcon MAGNET Enterprise web service is also included, enabling users to easily share data between the office and field.



HILLTIP

SprayStriker HFE (hi-flow electric) series de-icing sprayers

Released: 4/13/23

Availability: North American market

What's new? Available with Hilltip's largest tank capacities, from 500 to 3,250 gallons. Intended for municipalities and large contractors, the new models offer a high-performance, environmentally friendly solution for winter maintenance. Sprayers include specialized dual high-flow pumps and flow meters to pump exact application rates on demand with instant responsiveness. Because no bypass system is used, energy requirements are reduced, and the units can be fully powered by the vehicle's electrical system. The HFE series is zero-emission, unlike engine-driven sprayers, nor does it require the truck to be equipped with an expensive central hydraulic system.

Specs: Capable of high output for efficient ice management. The standard 12-volt models are capable of spray volumes up to 15 gallons per minute (gpm). A 24-volt kit is available for producing spray volumes up to 30 gallons per minute. In the cab, operators can monitor and manually adjust the sprayer settings through a user-friendly color-screen controller. When entering a jobsite, the operator can simply press a button to load customized application rates. The pump will then automatically adjust flow rates while the operator focuses on driving. Other standard features include a durable poly tank with an LED work light and beacon warning light, as well as a powder-coated stainless-steel frame. The two-lane, 90-inch-wide spray bar is equipped with double spray and side nozzles. The sprayers have a self-loading design and pump-out feature with a two-inch camlock connection.

CATERPILLAR

MH3050 material handler

Released: 4/24/23

Availability: North American & European markets

What's new? Offers high performance, reliability and cab comfort. The advanced electrohydraulic system optimizes the balance of power and efficiency, improving cycle times to handle more material in the same amount of time. The cab features joystick steering to eliminate the steering column and improve forward visibility, legroom and ease of cab entry. All controls are positioned in front of and within easy reach of the operator to avoid unnecessary movements. A large, 10-inch high-resolution touchscreen monitor with jog-dial offers easy navigation of the intuitive operator controls.

Specs: Boom and stick offerings combine to provide up to 59 feet, 3 inches of reach, allowing operators to move more material without repositioning the machine. Also offers high-swing torque to quickly move material. Allowing the boom to freely travel up and down without using pump flow, standard SmartBoom allows the operator to focus on stick and grapple control for a more fuel-efficient cycle. Large tempered glass windows with small pillars on the reengineered cab design enhance all-around visibility and safety.

Standard right-side and rearview cameras, with the option to upgrade to 360-degree vision, display video feed on the large in-cab touchscreen monitor to further enhance work area visibility. Equipped with 1,800-lumen LED lights on the chassis, boom and stick.





◀ KEEN UTILITY

Fort Wayne wedge work boot

Released: 3/14/23

Availability: U.S. market

What's new? Featuring a wrap-over rubber cap, the Fort Wayne moc toe wedge work boot offers flexibility, protection and traction. Other standout features include a direct-attached Luftcell air-infused, polyurethane (PU) midsole for weightless comfort, a barnyard-resistant leather upper, and KEEN.DRY waterproof, breathable membrane.

Specs: Safety enhancements include asymmetrical carbon-fiber safety toes that are unobtrusive and 15% lighter than steel, as well as a lugged, electrical hazard (EH)-rated oil- and slip-resistant rubber outsole. Available for men.

DEVELON ▶

DX1000LC-7 crawler excavator

Released: 4/25/23

Availability: North American market

What's new? The new 100-metric-ton conventional tail swing excavator is ideal for pit and quarry customers working in aggregate settings and well-suited as a large earthmoving and excavating machine for heavy construction and infrastructure projects. The DX1000LC-7 excavator includes smart machine technology and a rugged design for maximum uptime protection. Reinforced wear points boost reliability. The excavator's exclusive D-ECOPower system helps to improve productivity and save fuel. The hydraulic system precisely controls oil flow and optimizes the engine's available horsepower.

The system's efficiency not only improves productivity but also reduces fuel consumption.

Specs: Features two modes: boom and swing. This allows operators to adjust the machine to best match the job at hand, giving priority to boom or swing movements. Boom priority is ideal in harsh conditions, such as digging over the front or dumping over the side of the machine. Swing priority works best in normal or light-duty digging situations. The cab contains an 8-inch touch screen LCD monitor for high visibility and easy access. The screen is 30% larger than previous models. Ergonomic adjustments such as the newly designed foot pedals and heated seats make long days more enjoyable for excavator operators. Operators can configure the shortcut button on the joystick to their liking so they can adjust the wipers, mute the audio or control the camera. The button can also be used to activate the optional intelligent floating boom feature. This enhancement helps to increase operator effectiveness and keep the operator's hand on the controls.



◀ FECON

FMX28 Bull Hog Compact Excavator Mulcher

Released: 3/30/23

Availability: U.S. market

What's new? Capable of mulching overgrowth, underbrush and small trees, the FMX28 attachment offers a versatile solution for clearing land. Paired with 3.5- to 8-ton excavators, the compact package makes it easy to access traditionally difficult-to-reach places with precision.

Specs: Can operate with as little as 12 gpm, ensuring high performance in demanding site-clearing and mulching applications. With an overall width of 40 inches and a working width of 28 inches, the attachment mounts on excavators up to 8 tons, allowing a narrow mulching cut for precision vegetation removal. A variable displacement hydraulic motor optimizes rotor speed and torque for maximum production in small or larger materials. The mulching head features 14 reversible knife tools on a bite-limiting split ring rotor. The rotor design protects the carrier and provides ease of use for even inexperienced operators by virtually eliminating the possibility of overloading the attachment. The fixed knife design ensures a consistently small chip size and effective management of all vegetation from trees up to 5 inches in diameter. The reversible Cubit knives extend the total life of the tool to 140 to 200 hours per edge.

ROOSTER ▶

Rooster Asset Tracking System with SAE J1939 meter reading

Released: 3/15/23

Availability: U.S. market

What's new? Now includes meter reading and reporting capability for heavy-duty trucks and construction equipment using the SAE J1939 standard for data exchange. This feature is designed to make it easier to track and view current equipment telemetry, such as vehicle identification number (VIN), fuel consumption and engine hours. Specially developed plug-and-play cables conveniently connect to equipment data or dedicated telematic ports, minimizing installation effort.

Specs: System consists of Rooster Hubs, Rooster Activity Trackers and the Rooster App portal. Rooster Hubs are robust data portals that connect to the cloud through an integrated cellular connection to deliver equipment activity and telematics data, and accurate GPS location for \$10 per month. Rooster Activity Trackers are small, rugged devices that, once installed to any piece of equipment, capture activity on a minute-by-minute basis for up to five years. They transmit that data to Rooster Hubs up to 1.5 miles away, and through most concrete and metal to Hubs nearby using a long-range, low-power pairing protocol.



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▲ BRINNO

BCC300 Construction Time Lapse construction cameras

Released: 4/4/23

Availability: U.S. & U.K. markets

What's new? 1080P, HDR and 118-degree view angle; Waterproof IPX4 housing; Sunlight readable LCD display; Multilingual user interface; 100 days battery life and 128-gigabyte SD card storage; Interchangeable lens; Power by Brinno's first self-developed ASIC

Specs: Hands-off time-lapse technology automatically balances light and color, even in unstable lighting. These new time lapse cameras are available in two packages — the BCC300-C [Construction Bundle] and the BCC300-M [Mount Bundle] — with task-appropriate accessories for either clamp mounting or wall mounting. Users can create a daily filming schedule to record only during working hours, prolonging battery life and avoiding the need for tedious editing and deletion of hours of unwanted footage. The BCC300 lets users create professional time-lapse movies, which are auto-processed into ready-to-share video files.

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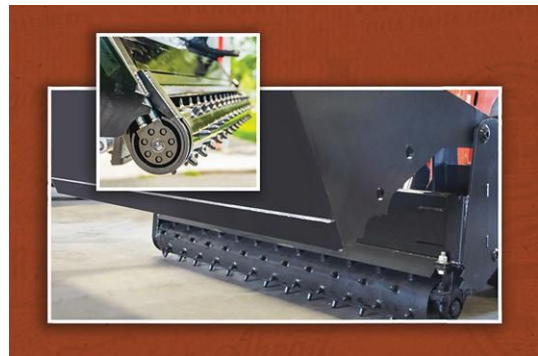
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▲ IRONCRAFT LLC

4-in-1 Bucket and Power Rake

Released: 4/12/23

Availability: U.S. market

What's new? Combines the advantages of a versatile 4-in-1 bucket with a rugged power rake. Users can dig, load, grab, and back drag as well as prepare the soil bed without changing attachments, saving time and enhancing efficiency on the jobsite. When reconditioning gravel, the power rake conditions the soil and kicks the largest rocks forward and leaves a smooth surface behind. The rocks can then be scooped up and removed with the bucket, which can also be used to place additional gravel in areas where needed — all without changing implements.

Specs: The 4-in-1 Power Rake is supplied with a smooth edge bucket, a bolt on edge or welded teeth are optional. Users who opt for bolt on teeth for more aggressive digging can raise the grapple and use the back side of the bucket as a smooth edge bucket for an all-in-one solution. IronCraft 4-in-1 Power Rakes are available in various widths and sizes from mini-skid-steers to full-size machines. With many timesaving uses, they are ideal for a wide variety of on farm applications as well as those on orchards and vineyards, landscape or construction sites and more.

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- ☐ 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)

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- ☐ 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
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Annual Value of Construction Put in Place

March 2021/2022/2023 Annual Rate Comparison

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

	2021	2022	2023
Total Private Construction	1,169,199	1,379,653	1,435,052
Residential	725,245	882,045	827,696
Nonresidential	443,954	497,609	607,355
Total Public Construction	343,886	350,816	399,640
Residential	9,323	9,236	9,851
Nonresidential	334,563	341,580	389,789
TOTAL Construction	1,513,085	1,730,469	1,834,692

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

\$1,834,692

MARCH 2023 TOTAL ANNUAL VALUE OF
CONSTRUCTION PUT IN PLACE

“Despite the positive movement in architecture firm billings in March, **core concerns remain,**” said AIA Chief Economist Kermit Baker, Hon. AIA, Ph.D. **“Inflation still needs to ease further for interest rates to return to more normal levels, and the banking turmoil still threatens to hold back residential and commercial construction loans.”**

AIA Architectural Billings Index (ABI)

National			*Regional - Billings				*Sectors - Billings			
Month	Billings	Inquiries	Northeast	Midwest	South	West	Multifamily Residential	Commercial/Industrial	Institutional	Mixed
Oct-22	47.7	52.3	50.3	50.8	50.6	49.6	46.1	45.9	54.3	50.8
Nov-22	46.6	52.0	42.4	47.6	50.5	45.8	46.1	44.2	47.7	51.5
Dec-22	47.5	52.3	46.5	49.4	48.6	45.5	44.3	45.2	47.3	54.8
Jan-23	49.3	55.2	50.9	51.6	46.9	51.3	45.9	46.8	48.6	56.0
Feb-23	48.0	55.0	48.4	48.8	47.3	50.4	46.2	45.8	46.9	57.0
Mar-23	50.4	53.1	49.1	51.4	47.4	47.2	44.2	49.7	48.8	53.9

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

*Regional and Sectoral indexes are three-month moving averages, due to small sample size. All data is seasonally adjusted.

**Every January, the AIA research department updates the seasonal factors used to calculate the ABI, resulting in a revision of recent ABI values.

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