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FROM THE EDITOR | Kathy Wells



Editor Kathy Wells poses with Rob McKinney, James Benham and Josh Bone, the hosts behind the ConTechTrio, a weekly podcast dedicated to sharing construction technology experience, research and innovation. Last month, the trio aired a live broadcast from the ConTech Roadshow in Atlanta, Georgia. The 1-day, interactive technology conference featured educational sessions from industry professionals, as well as tech demos.

My grandfather always said, "As long as you're in school, you're a success." Education was a great driver in his life. His words echo in my ears as I think about the new year. Now I'm lending the phrase to you, reader. This year, in particular, brings an abundance of change, and it is incumbent upon you to prepare your company for those changes, whatever they may be. The industry is always adapting, and so must your company. And that requires maintaining a constant state of education in all aspects of your business. Not every strategy is gold, but learning from experience—and making the effort to continue to learn—is what will continue your success.

Our annual State of the Industry report begins on page 22, with an industry outlook from FMI Corporation Chairman Hank M. Harris. Harris shares an analysis of industry trends and predictions for the short- and long-term health of the construction industry. On page 26, Managing Editor Elizabeth Manning details two changes to the industry that you will need to pay attention to in 2017: a new president and new technology solutions. Wrapping up the section on page 28, risk and insurance specialists provide their insights into what trends will be shaping the insurance marketplace in 2017.

Later this month, the *CBO* team will attend World of Concrete, held at the Las Vegas Convention Center, January 16-20. The show provides the industry with products and services to help streamline processes and offers hands-on training and demos in special product and action areas, including: The Producer Center—a marketplace of materials, equipment, demos and seminars for concrete producers; Material Handling—offering trucks, excavators and more for material delivery, distribution, concrete placement and earthmoving; Concrete Repair & Demolition—displaying surface preparation equipment, scarifying, grinding, sawing equipment and other demolition products; World of Masonry—showcasing products, tools, information, and technology for masonry professionals; Technology for Construction—featuring the newest products and tools for the commercial construction industry from top IT and systems providers; Concrete Surfaces & Decorative—showcasing the popularity of decorative concrete for both commercial and residential applications; and Precast—highlighting the latest products and technologies in the precast/prestressed sector.

Keep up with our team on Twitter during World of Concrete by following @CBOMagazine, @KathyWellsCBO and @EManningCBO. We will share info live from the trade show floor, including equipment demos, event coverage and new products as they are announced.

Take care and have a Happy New Year!

Kathy Wells

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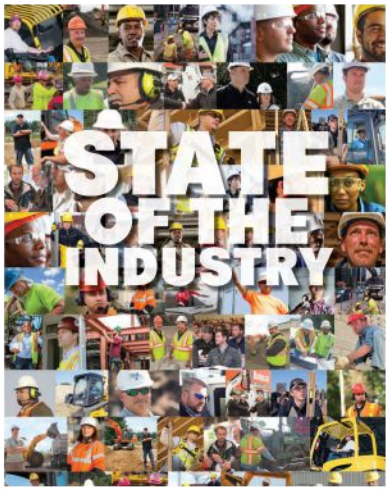
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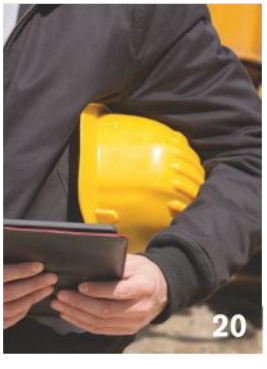
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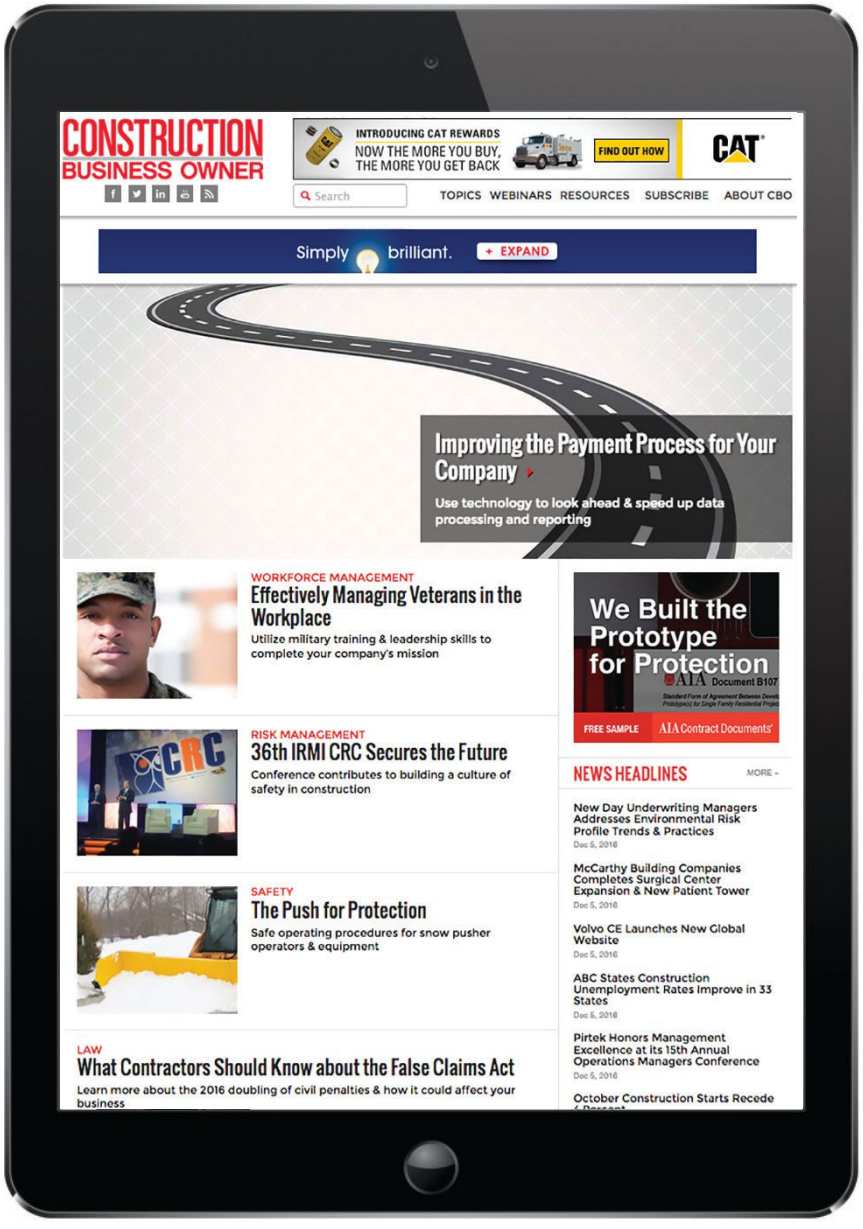


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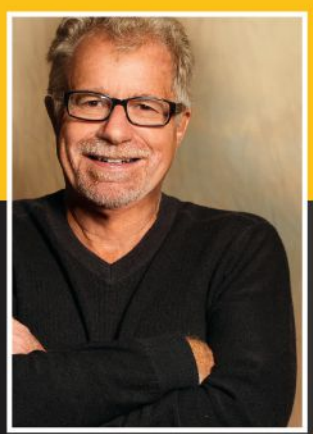
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Safway Group Acquires SafeWorks

Safway Group Holding LLC has acquired SafeWorks LLC. Headquartered in Seattle, Washington, SafeWorks provides motorized suspended access equipment sales, rental, services and support through 25 company branch locations in the Americas and a global dealer network. The company has manufacturing facilities in the United States, South America and Europe. Safway has acquired 14 companies over the past 6 years as part of its strategy to expand service offerings in core target markets —energy and industrial, as well as commercial restoration, refurbishment and new construction. SafeWorks is a complementary business for Safway Group. Visit safwaygroup.com.

Pella Corporation Acquires Duratherm Window Corporation

Pella Corporation announced the acquisition of Duratherm Windows Corporation. Duratherm Window Corporation remains under the leadership of Tim Downing, president, and maintains its brand and attention in the luxury marketplace. Over time, Duratherm will be integrated into the Pella Crafted Luxury collection. This is the third acquisition for Pella during the past 2 years, which includes Grabill Windows & Doors, acquired in 2015, and Reilly Windows & Doors, attained in July 2016. The terms of the sale will not be disclosed, as Pella and Duratherm are both privately-held companies. Visit pella.com.

Arcadis Hires Vice President & Project Director

Arcadis announced Peter Turton, PE, will join the company as vice president and project director. In his role at Arcadis, Turton will be responsible for managing the construction of the firm's future, multibillion-dollar rail transit projects. Turton brings more than 40 years of professional experience to Arcadis and is among an elite handful of world-renowned rail construction management experts. Turton has extensive experience as construction manager, having overseen over $20 billion in major infrastructure projects, both domestically and overseas, including rail transit. He is a registered professional engineer in the state of California and a chartered engineer in the United Kingdom. Visit arcadis.com.

HCSS Announces Construction Intern Award Winners

Construction software developer HCSS announced the winners of its annual Construction Intern Awards. A total of 17 scholarships worth a combined $50,000 were awarded to students in construction-related fields who held internships of at least 2 months in duration with construction companies during the 2015-2016 school year or summer of 2016. One grand prize winner, four finalists and 12 honorable mentions all received scholarships. Rey Diaz, a student majoring in civil engineering/structures at the University of South Florida, received the grand prize scholarship of $10,000. He interned with Skanska USA Civil Southeast in Florida during the summer of 2016. The four finalists receiving a $4,000 scholarship were Sophie Seel, University of Dayton, interning with Marathon Petroleum Company; Sergio Lescano, Missouri State University, interning with Killian Construction Company; Evan Albright, California State University, Sacramento, interning with Royal Electric Company; and Kent Beechman, California Polytechnic State University, interning with Myers and Sons Construction, L.P. Visit hcss.com.

LeaseQ Acquires Noesis

LeaseQ announced the acquisition of Noesis, based in Austin, Texas. Noesis will serve as LeaseQ's Austin presence. Noesis brings a set of equipment sellers to the LeaseQ platform, including leading manufacturers of energy efficiency equipment, and mechanical service and LED lighting companies. LeaseQ's network of more than 300 lenders, instant quotes and real-time credit approval will enhance the Noesis customer experience with higher approval rates, lower interest rates and improved deal close rates. Customers will experience no changes to Noesis software or services, but will receive access to additional LeaseQ features over time. LeaseQ plans to expand its sales and funding teams to support the companies' combined growth, and to maintain Noesis's Austin office to expand on the presence the team has created. Visit leaseq.com.

On Center Software Names New Vice President of Sales

On Center Software has hired Jerry Morgan as the new vice president of sales. Morgan's 20-plus years of sales, marketing and client engagement experience at BMC Software and Idera includes team building, people development and engineering easy-to-use, intuitive software. Morgan is also on the company's executive vision team, a think tank on the future of construction automation. Before joining On Center, Morgan was an instrumental member of the senior executive team at Idera that led the transformation into a high-growth, high-velocity and tightly integrated marketing and sales engine powered by solutions designed and engineered for ease of use, intuitive navigation and rapid, out-of-the-box value realization. Visit oncenter.com.

Terex Names Director of Customer Engagement Strategy, Sales & Service Organization



Mark Aubry

Terex announced the appointment of Mark Aubry as director of customer engagement strategy, sales and service organization (CESO) for Terex Mixer Trucks. He replaces industry veteran David Rinas, who held the director of sales position since August 2008, and announced his planned retirement from the position earlier this year. Aubry now leads all customer-facing activities, including sales, service and aftermarket parts teams. He is responsible for strategic sales planning and staffing for Terex front discharge mixer trucks. His responsibilities include the development and implementation of a strategic sales plan to enhance customer interaction, grow market share and achieve company goals and objectives. Prior to joining Terex, Aubry served as the vice president of sales and marketing for the components division of a Canadian alternative fuel transportation company. Visit terex.com.

HiPower Systems Names Vice President of Sales & Marketing, Portable Power

HiPower Systems announced it has hired Josh Mosko to the position of vice president of sales and marketing, portable power. Mosko will develop sales and marketing strategies, nurture business opportunities, research opportunities and target markets, identify and generate leads for the sales team and foster strong, productive business relationships with company prospects and customers. Mosko will play a management support role for the HiPower Systems sales departments, directing and coordinating company sales and marketing

functions and helping staff seize and fulfill the potential of business opportunities and then move customers through the sales pipeline. In 2013, Mosko was an award recipient of Hertz Corp's Global Leadership Award. He also helped Kinsley win the Kohler Distributor of the Year award in 2006. Visit hipowersystems.com.

CNH Industrial Honored with AEM 'Pillar of the Industry Award' & Legacy Award

The Association of Equipment Manufacturers (AEM) honored CNH Industrial with its "Pillar of the Industry" award, recognizing the company's work to improve the business environment for the equipment manufacturing industry in the United States of America in 2016. This is the fifth consecutive year that CNH Industrial has been recognized for its efforts to advocate for pro-manufacturing solutions to elected leaders and voters, and for their participation in AEM's "I Make America" grassroots program. CNH Industrial was also presented with the special "Legacy Award," which honors 5 consecutive years of achieving "Gold Status" in the "I Make America" program. CNH Industrial operates 11 manufacturing facilities and 13 research and development centers throughout the U.S. that employ more than 11,000 people. Visit cnhindustrial.com.

Toro Names Vice President of Sitework Systems Business



Rick Rodier

The Toro Company has named Rick Rodier vice president of Toro's Sitework Systems Business, after previously serving as general manager. Rodier will continue to manage the day-to-day operations of the Sitework Systems Business, in addition to taking a more active role in strategic planning for The Toro Company as part of the executive management team. Rodier has been with Toro since 1987, and has held a variety of operational, marketing and business management roles. He was named general manager of Toro's Landscape Contractor Business in 2004, and appointed to head up Toro's new Sitework Systems Business in 2009. During his tenure at Toro, he has been instrumental in a number of key company initiatives that have driven growth for the Sitework Business and the company. Earlier this year, Rodier was named the 2017 chairperson for The International Construction and Utility Equipment Exposition (ICUEE), and also serves as a director on the Construction Equipment (CE) Sector Board of AEM. Rodier officially assumed his duties as vice president of the Sitework System Business on October 12, 2016. Visit toro.com.

Gallina LLP Joins CliftonLarsonAllen

Gallina LLP will join national professional services firm CliftonLarsonAllen LLP (CLA). For nearly 45 years, Gallina has served organizations both large and small. Under the terms of the agreement, Gallina will assume the CLA name, and Larry Taylor, managing partner of Gallina, will actively serve on the CLA leadership team as chief practice officer. CLA has retained the agility to serve clients of all sizes and locations. Gallina and CLA will double their expertise in the construction and real estate arena, and strengthen capabilities in agribusiness, manufacturing and distribution, and the many other industries that make up the private sector. Gallina's team of over 300 employees will continue to serve clients locally and nationally from locations in California, Nevada, Utah and Washington. Visit CLAconnect.com.

Telogis & John Deere Announce Partnership

Telogis announced that it is partnering with John Deere to enable construction companies to derive key data and insights from their connected John Deere equipment to help drive cost savings, efficiency and productivity. Telogis and John Deere will enable existing and future mutual customers to leverage John Deere construction equipment's built-in connectivity. Customers will benefit from access to a richer data set that will help to eliminate manual data entry and generate deeper insights into customers' operations. Customers also benefit from the ability to connect back into JD Link to order parts and service or contact local John Deere dealers for questions, appointments and equipment troubleshooting. Customers can also take advantage of the Telogis Mobile Resource Management (MRM) software platform's comprehensive feature set. Customers' cost structures are also optimized by leveraging the John Deere telematics devices that come built into the equipment from the factory or installed aftermarket at an authorized dealer. The offering will be available to organizations of any size through connected John Deere equipment or through authorized dealers through the end of 2016, and each new piece of equipment will have access to both JDLink and Telogis. Visit telogis.com.

Curry Supply Names Strategic Account Manager



Jim Hanson

Curry Supply Company has announced that Jim Hanson has joined the organization as strategic account manager. Hanson comes to the company with more than 11 years of experience in fleet management from a dealer in the Philadelphia, Pennsylvania, area. His previous positions included fleet manager, fleet administrator/purchasing agent and accounts payable. As strategic account manager, Hanson will play a critical role in developing customer relationships, ensuring client satisfaction and identifying new opportunities for a large client base throughout the United States. Hanson has his certifications in Certified Automotive Fleet Management and Certified Automotive Fleet Specialist. Visit currysupply.com.

Denso Names Director of OE Sales, Marketing & Strategic Planning

Denso Products and Services Americas Inc. has promoted David H. Williams to director of original equipment sales (OES), marketing and strategic planning. In the newly created position, Williams oversees all aspects of Denso's original equipment service sales, product development and original equipment service parts while continuing to manage the company's Marketing and Strategic Planning departments. Williams has played a key role in Denso's alignment of its global and North American aftermarket growth plans since he joined Denso in 2013 as manager of the strategic planning department. He was hired shortly after Denso Corp. completed the reorganization that led to the formation of Denso Products and Services Americas. Williams was brought in to oversee the department's daily operations. Visit densoautoparts.com.

Hyundai Construction Equipment Adds Product Specialist & Sales Trainer



Michael Fuller

Hyundai Construction Equipment Americas Inc. announced the addition of Michael Fuller to its marketing team as a product specialist and product sales trainer. Fuller is responsible for product training of Hyundai dealers, focusing on excavators. Fuller joins Hyundai with 19 years of experience in the construction equipment industry, including 13 years as a customer support technical representative at a major OEM. Visit hceamericas.com.

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To submit a question, email Managing Editor Elizabeth Manning at emanning@cahabamedia.com.

The Tech Transition

What's the most disruptive technology facing your construction company in 2017?



ANGELO LANGADAKIS III, ESQ.
Law Office of Angelo Langadakis III, P.C.

"Automated field measurement with simultaneous CAD and BIM integration for project managers among all trades is likely to be the most disruptive technology in the construction industry over the next 30-year period. Reduction in measurement error, labor hours saved from avoiding redundant performance of the exact same task across all trades and an improvement in timely and accurate communication of field conditions and progress across all trades are likely to be benefits that owners, lenders and insurers will insist on in their standard contract documents moving forward. The benefits of risk reduction and savings far outweigh the costs. As a result, we can expect an overall decrease in change-order work. On a more macro level, many blue-collar workers are due to retire soon, without many younger workers getting excited about picking up a career as a plumber or electrician. This shift in technology playing a larger role in construction is likely to turn an industry historically dominated by men into an industry more easily accessible by educated, white-collar workers, women and minorities. As technology replaces human labor in the field, we may see trade labor unions consolidating in order to preserve bargaining power. Some could even become obsolete.



ROB MCKINNEY
ConAppGuru
JBKnowledge

"Jobsite tracking is poised to have a huge impact on the construction sites of 2017. The question of how to track workers on project sites has gained a lot of attention in 2016. There are two important sides to this debate. On one side, workers fear extensive monitoring and the thought of Big Brother watching over them. On the other side, contractors are chasing the holy grail of productivity (aka percent complete), and worker tracking is a very viable solution. With major advances in mobile technology, smartphones now come equipped with features, such as GPS, that have created opportunities for third-party apps to know and track the smartphone's location. This can be of great benefit in locating missing employees during emergency situations, issuing alerts in unsafe zones and granting access to various areas of the jobsite. Where this technology gets a little sticky is in how the tech solution knows where the employees are working, all day long. There are several great emerging apps, such as BusyBusy, TSheets and Rhumbix, that are working on tracking the hours that employees are working to quantify productivity. These companies are also working with hardware options, such as Primal Sensors and Redpoint Positioning, to provide accurate X, Y and Z coordinates to precisely track employee movements in real time. These jobsite tracking solutions are likely to not only cause disruption, but also increased productivity in 2017.

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New Year, New You

Identify the priorities on your company's fix-it list & start making changes



George Hedley, CSP, CPBC, is a professional construction BIZCOACH and industry speaker. He helps contractors grow, profit, build management teams and get their businesses to work for them. He is the best-selling author of "Get Your Construction Business To Always Make A Profit!," available at amazon.com. Email gh@hardhatpresentations.com to sign up for his free e-newsletter, start a BIZCOACH program, attend a 2-day BIZ-BUILDER Boot Camp or get a discount at hardhatbizschool.com, an online university for contractors. Visit hardhatpresentations.com for more information.

ASK GEORGE

To submit a question for George Hedley, email Managing Editor Elizabeth Manning at emanning@cahabamedia.com.

A professional football team that starts a new season without addressing areas for improvements probably will not develop a winning season or a better record. A group leaving for a cross-country trip without a plan, a map, a list of needs or the right resources might end up with problems.

At your construction company, starting the year without a written list of improvement areas, a specific business plan, measurable goals or a budget wouldn't be a good idea either, especially if you want to grow your company and make more money. Improving your profit margin requires a plan to make it happen. Making more net profit starts by identifying what you can fix. You might need to hire stronger managers, implement a profit enhancement program, standardize your change order rates, apply a monthly project management review process, develop a job checklist, or upgrade integrated financial and estimating software programs.

So, what steps are you taking to make this year better than the last? What changes are you going to make to improve your projects, people, productivity, systems or results? What are you doing about training future workers, foreman or project managers to become the company leaders you need? What are you going to stop doing or start doing to improve the value of your business, secure better customers, make higher margins and improve ROI?

SPEND MONEY TO MAKE MONEY

Successful companies invest time to get their management team together during the first month of every year to review performance during the previous year. After review, they analyze what they need to do to improve over the next 12 months. To make sure they achieve their desired results, they meet monthly to update their progress and make the adjustments to keep on track.

As a business coach, I often facilitate these annual company management meetings. As a team, we work together to draft a "fix-it list" of the processes that these contractors need to improve over the next year. Some contractors are able to organize and create successful management teams and business plans by investing in workshops or books to learn how to develop their own business plans. Others have better luck hiring a professional consultant to assist with the process. Whichever method you select, it takes time, money and dedication to build a better company.

DETERMINE WHAT TO FIX

What accomplishments, changes and improvements do you want to achieve? Where do you want your company to be? What will make your next year's results better than last year's results? What problems regularly occur that need to be fixed or eliminated? Start by making a list.

For example, many companies understand that they need to know their field



production costs, but they don't have a good job-cost tracking system to keep up with actual costs on a weekly or completed contract basis.

This causes them to bid projects by guessing or using the wrong labor production rates. Other companies might know they should spend more time cultivating and developing loyal customer relationships, but they don't do anything to make it happen.

As a result, they continue to generate sales by being the lowest bidder, instead of negotiating with loyal customers. My observation is that the same problems and challenges keep ending up on annual lists for companies of all sizes. Take a look at the following common list items from construction companies. Check off each area in which you would like to improve over the next year. Rank each area as a top priority to improve (A), medium priority (B) or low priority (C).

FIX-IT PRIORITY CHECKLIST

Management Team

- ☐ Set regular meeting schedules
- ☐ Develop a management team
- ☐ Delegate responsibilities to team
- ☐ Develop and track company goals
- ☐ Review financial results monthly

Estimating

- ☐ Develop accurate estimates
- ☐ Upgrade estimating software
- ☐ Maintain job-cost history
- ☐ Standardize burden rates
- ☐ Standardize change order time and materials rates
- ☐ Eliminate missed items
- ☐ Improve subcontractor and supplier coverage

Business Development & Sales

- ☐ Improve bid-hit win ratio
- ☐ Acquire better customers
- ☐ Seek higher margin work
- ☐ Bid against less competition
- ☐ Manage customer relationship program
- ☐ Implement customer contact program
- ☐ Manage referral program
- ☐ Improve proposal and presentations

Project Management

- ☐ Eliminate profit-margin shrinkage
- ☐ Develop PM standards and systems
- ☐ Improve turnover from estimating
- ☐ Create contract writing standards
- ☐ Standardize submittal system
- ☐ Improve scheduling system
- ☐ Improve change-order management
- ☐ Develop job closeout system

Field Management & Production

- ☐ Improve time-card system
- ☐ Manage job-cost tracking system
- ☐ Update scorecards for foremen and supervisors
- ☐ Upgrade scheduling and logistics
- ☐ Eliminate callbacks and punch-list
- ☐ Improve safety management
- ☐ Standardize field meeting agendas
- ☐ Set standard job and crew rules
- ☐ Systemize equipment management

Organizational Chart

- ☐ Develop accountable job descriptions
- ☐ Articulate a clear chain of command
- ☐ Eliminate poor performers
- ☐ Hire positions needed
- ☐ Improve staffing responsibilities
- ☐ Develop better hiring system
- ☐ Implement hiring incentive plan
- ☐ Manage training program
- ☐ Execute employee review system
- ☐ Implement a results-based incentive program

Accounting & Administration

- ☐ Upgrade software
- ☐ Provide timely financial results
- ☐ Improve collections system

Now that you have created a working list of your highest priorities to fix or improve over the next 12 months, get your management team together and whittle the list down to a short list of your top five priorities. Too many companies try to fix 30 things at once and fail.

Assign team captains to work on each of your top five improvement areas. Ask them to gather a team to help them create a standard or system to fix their assigned problem. Develop a deadline for each area of improvement.

When a standard or program has been created for the different areas, you can then move on to the next top priority. Get your team together and take the time to list out what you want and what changes are needed to achieve your goals. **CBO**

It's a Crazy World & We're Just Building It

A glimpse of the trends shaping the strategy in 2017



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The new year comes with both an equal balance of guarded optimism and nervous trepidation. The election cycle has concluded, and the only inalienable truth that everyone can agree on is the satisfaction of no more political advertisements blotting the airwaves. However, regardless of affiliation or outcome, construction leaders will need to rise up and lead their businesses through a quagmire of obstacles, challenges and potential opportunities in 2017. Industry changes seem to occur at the speed of light, while adopting suitable strategies tends to lag. Some of the reluctance lies in the perception that certain contextual or environmental factors will be short lived. On the other hand, there is also a fair amount of "behavioral inertia" that must be overcome. Best-in-class firms create a strategic plan that adequately sifts through the tea leaves to make smart decisions for the future.

DATA-DRIVEN STRATEGY

Organizations sit on a treasure trove of information, but they either lack the system or the capability to mine that data successfully. Whether the goal is understanding the true costs associated with managing specific projects or understanding which clients allow a firm to be the most profitable, firms must routinely gather and analyze this data. Furthermore, firms must continue to dig deeper to understand some of the following influencing factors.

- *What drives your customers' business*? Supply, demand, population growth, support businesses, etc.
- *What KPIs, whether internal or external, will drive a firm's strategy*? Customer feedback, productivity performance, market penetration, etc.
- *What macroeconomic forces should a firm understand*? GDP, AIA billings index, populations changes, etc.
- *What triggers are in place to help a firm make fact-based decisions*? Backlog growth/depletion, manpower histograms, equipment utilization, etc.

THE LABOR CRISIS

Whether it is good or bad, there remains a labor crisis associated with the construction industry. In some cases, the ability to staff construction projects successfully has provided a regulator for some firms to avoid overextension. But there appears to be no real solution on the horizon. Market forces may well dictate the supply of labor, thus limiting firm capabilities. However, there are examples of best-in-class firms maintaining a proactive stance within high schools, technical schools, vocational schools and colleges and driving the right people to their cause. Keep in mind, sourcing the labor is only part of the dilemma. Having the right culture to retain a strong workforce is critical. Training, development and performance-driven compensation are also critical elements.



PERFORMANCE-DRIVEN COMPENSATION SYSTEMS

The "black box" approach to compensation or the year-end Christmas bonus are both becoming antiquated and obsolete. Successful firms are migrating towards performance-driven compensation models. To be clear, this is not project-based compensation, as that opens a whole host of additional issues.

Today's emerging workforce wants to see transparency in their compensation. High performers also want to know that their efforts are being rewarded. It goes without saying that retention of high performers is essential for both short-term and long-term strategic reasons. Firms that are implementing performance feedback, career path discussions and true, performance-driven compensations tend to attract better associates, thus becoming a talent magnet.

INNOVATION

High performers want to be on the cutting edge. This is not limited to technology, but it certainly does play a role. Social media, GPS technologies, prefabrication, modularization, automation and drone technology are not new solutions, but they all certainly play a role in attracting talented individuals. These tech solutions either play a part of lead-specific areas to leverage better productivity, enhance job performance or drive a better product to the end-user. Is your firm fully committed to innovating, or are you just dabbling?

SUCCESSION WOES

Firms, and particularly their leadership, are not getting any younger. There are many firms that still resist developing a proactive succession plan for ownership. Keep in mind that this is easily a 10-year process. Finding the right candidates is not enough. It is also important to consider the financial model that will allow ownership transfer to take place in a fair, equitable way. This trend is hardly limited to ownership. Firms across the board are getting older at the key stakeholder level. Succession will remain a key factor for firms in the next 5 to 10 years, but it is only exacerbated by the state of the talent pool for the industry.

BEING ATTRACTIVE IN THE NOW

Best-in-class firms are focusing on rebranding themselves. Rebranding themselves as "solutions providers" sounds kitschy and clichéd, but the ones that do it successfully, through deliberate and disciplined planning, have opened doors to new markets, customers and sources of labor. For instance, by taking a chapter from the professional services industry, trade contractors are using this rebranding to appear "gray collar" to potential customers and employees alike to find work in nontraditional areas.

MARKETPLACES

Once again, by employing a data-driven strategy, firms are looking at geographies differently. For instance, port cities, such as Jacksonville, Florida, and Charleston, South Carolina, continue to remain darlings because of the expansion of the Panama Canal. While it is not the only reason for success, thinking macroeconomically has enabled firms to be positioned better to allow for successful growth and opportunities for superstars. Before everyone thinks about planting a flag in Jacksonville or Charleston, it is important to look at other drivers, though.

For instance, look at the impact of Amazon and Jet. Distribution centers will continue to be important areas of the American economy as the world of e-commerce morphs yet again. Furthermore, as innovation continues in the autonomous vehicle arena, there will be continued opportunities. Even if building millions of square feet of distribution space does not fit in to your firm's strategy, ancillary business opportunities will abound.

The one common denominator is uncertainty. In spite of the new things on the horizon, there is always the specter of war, terrorism and other insidious outcomes that will shake the foundation of America. The term "Black Swan effect" came into vogue after the last great recession.

While the financial crisis created one of the most devastating economic disasters in modern times, it, too, passed with time. It is difficult, if not impossible, to plan for such events.

However, best-in-class firms will use these projected trends to help drive a strategic plan that creates success, regardless of the world's current craziness. **CBO**

Paving a Career Path in Subcontracting

How to guide the next generation of leaders to find the right opportunity

BY BEN ASHBURN

I spend most days interacting with our industry's next generation of leaders, and often have the opportunity to discuss with them their future plans. When the conversation turns to career paths, the typical response involves working as a project manager for a general contractor (GC). While that is inarguably a great career path, why not become an estimator or a superintendent? Rather than general contracting, why not consider a subcontractor, specialty contractor or supplier?

Most undergraduate construction programs focus on commercial general contracting, with some civil, residential and specialty peppered throughout for good measure. If you currently work in one of these positions, and you have wondered how to attract young talent to your profession, the simple answer is to overcome a lack of awareness.

As a former estimator, I enjoy promoting the career path of an estimator to students who show an interest. Instead of focusing on more mundane tasks, such as quantity takeoff, I appeal to their competitive side. If passing the torch to the next generation interests you, try getting involved with the nearest college or university's construction program. Tell students your war stories and why you do what you do. Offer job shadowing, guest speaking and company tours. Reach out to these students, and you will



be surprised how many respond. They only need one spark to lead them down a potentially fulfilling career path.

I also teach a construction materials and methods course at Texas A&M University, where students learn the basics of typical building materials and assemblies in most of the divisions of work. This is a practical venue to discuss the many different subcontractors and specialty contractors who supply and install these divisions of work.

Recently, I asked alumni and industry partners about why they chose a career in subcontracting, and how to encourage students to consider doing the same. Houston-area alumni Marcus Bollom and Brent Ballard, of interior finishes subcontractor Marek Brothers, and Tim Shaw, of Chamberlin Roofing & Waterproofing, provided valuable perspective and advice to other subcontractors seeking ways to promote their profession. Read their insights below.

What interested you in pursuing a career with a subcontractor?

Bollom: Early on, I realized that I was much more interested in getting involved with the details and logistics of putting

the work in place. And I wanted to work closely with craftsmen to do so. This is not to suggest that the GC doesn't also have an opportunity to engage more closely with the process, but is naturally less so than that of the subcontractor.

Ballard: Though the [construction science] program was heavily focused on general contracting, the required internship that accompanied the program could be in any area of construction. I feel fortunate that my internship opportunity in the electrical field allowed me to experience the subcontracting world and its benefits firsthand.

Shaw: Mainly, I was looking for stability and longevity in my career. I had just gone through a period of high turnover, due to the economic downturn, and was reevaluating my priorities. Subcontractors had business outside of new construction starts, which interested me and offered seemingly more opportunity long term.

What are some benefits of working with a subcontractor over a GC?

Bollom: Because the GC is responsible for the scope of the entire project and, therefore, works directly with multiple subcontractors through all phases of a project, the time commitment often requires long work hours and weekends. By comparison, the relatively narrowed scope of work for the subcontractor allows for more flexibility and limits the exposure to the same schedule demands. So long as we are able to keep with the project schedule and sequence by ensuring resources are dedicated to the job, including labor and materials, and we are effectively coordinating our work with the other trades, we are able to maintain a routine work schedule. This allows for a more balanced personal and work life.

Ballard: One of the benefits of working with a subcontractor is the ability to be a part of a wide variety of projects. Depending on the subcontractor trade, these projects may all be at different stages of completion. Knowledge and control are also major benefits. Having direct control over your own labor force and a very specific knowledge of the work allows you to be an important asset to your customers. This can be extremely gratifying, and the accompanying relationships and trust built continue to grow exponentially throughout a career.

Shaw: There is definitely a benefit from only having to focus on one set of skills. As an employee on the general contracting side, you often have to keep a pulse on anywhere from 1 to 27 different skilled trades on as many projects as you have open, in progress or closing at the time. Your focus is drawn in a multitude of directions. It wasn't until I came to a subcontractor that I felt that I fully understood a scope of work and all of the details that went in to it. As opposed to wearing many hats, I now wear one, and I feel like I can master my trade and offer a valuable service to my industry.

How can subcontractors engage students to promote a career path?

Bollom: It is my experience that college professors often welcome guest speakers to participate in lectures and share real-world experiences and scenarios relative to the course material. This is a great opportunity to meet students and possibly broaden their perspective on career opportunities, especially at a time when students are still determining their area of study. In addition, extending part-time or summer job opportunities to students is a great way to not only witness their work ethic, but also immerse them in the field of construction.

Ballard: Subcontractors have the ability to offer structured, hands-on internships to students. Integrating students into work crews can allow them to instantly become a part of the construction process, see the construction from an angle not available with a general contractor and feel the pride of being a part of the team that put the work in place.

Shaw: Subcontractors need to make time to get in front of students and educate them on the opportunities in subcontracting. While discussing opportunities, they should invest time in teaching skills regarding their individual trades. When I was in college, the classes that stayed with me were the ones in which I felt I gained practical, real-world knowledge. What better real-world knowledge can you get than hearing a skilled tradesman speak about his/her specific skill set and materials? The key element here is investing time in the young people who are making important decisions about the course their life will take. Time is valuable, and how you spend your time, in regard to the next generation of constructors, will make a huge difference in how many students gain interest in a skilled trade in the future.

These are model examples of how to reach out to the next leaders in your chosen profession. Understanding the importance of engaging students at this stage in life, when they are considering many different options, is critical. Investing your time now will pay out future dividends in the form of educated and motivated employees who are enthusiastic about what they do; all because you engaged them at just the right time in their lives. **CBO**

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Benchmarking in Construction

A primer on setting goals & building a strategy to improve operations

BY GUY SKILLETT

How does your company's labor output compare to the competition? How can you achieve improvements when labor productivity in the industry remains static? Benchmarking is a method of improving performance in a systematic way by measuring and comparing performance against others. It involves the identification of improvement needs within an organization and consideration of how organizations can realize improvements via the adoption of best practices, lessons learned or other forms of innovation.



The combination of benchmarking and labor productivity is not a simple concept. There is no one single parameter that can be used to determine who is best, and the question of why a project, activity or entity performs well is not always obvious. There isn't a huge amount of accessible information available to help firms identify and recreate best-in-class performance. Benchmarking involves identifying best-in-class performance against which to compare a firm or organization's performance. The underlying characteristic of a benchmark is that it reflects business performance that has been achieved in real-world operating conditions. Benchmarking can also reflect the best performance observed within a company, between projects or crews. The challenge is recognizing where best-in-class performance exists and understanding the conditions that have allowed it to flourish. Before implementing an improvement program, it is important to understand the most common types of benchmarking.

1. *Industry level*—Obtaining transparency of construction performance across the industry and its many sectors is challenging. Few national or regional initiatives exist for establishing and communicating benchmarks across the industry, meaning efforts at comparing performance can be challenging. Some countries publish national benchmarking data, such as the U.K., while firms in the United States have executed surveys that seek to gather and publish benchmarking data, which is then made available to the industry. Firms looking to assess this data must take care to leverage the correct data sets to assure a like-for-like comparison, and identify the underlying characteristics, assumptions and operating conditions in which the data was obtained.
2. *Competitive*—Competitive benchmarking, where firms assess performance against competitor firms, is a little harder to execute based on a lack of publically

available data. Some resources exist to facilitate comparison, but firms will typically have to make assumptions about the underlying business and operational conditions within which the data was measured and generated, which may result in inconsistent comparisons.

3. *Internal*—For most firms, internal benchmarking will be more helpful in identifying internal processes or behaviors that can be the basis of performance improvement, and will often take the form of a comparison of projects, sites or teams. The aim should be to identify a desired level of performance, informed by key performance indicators, and establish a systematic process, possibly driven by lean approaches, Kaizen or Six Sigma, to achieve this across the entire organization. Set tangible targets to allow incremental improvement and ongoing measurement in support of benchmarking objectives to be met.
4. *Cross industry*—Construction lags behind almost every other sector in terms of innovation and production efficiency. However, technologies that seek to bring manufacturing efficiencies to the construction industry are numerous. Robotics, 3-D printing, field digitization, autonomous equipment and advanced surveying and visualization techniques all have parallel deployments in other industries that we can learn from. There are extensive opportunities for workflows, processes and behaviors from other industries to cross-pollinate construction and lead to new ways of managing projects and executing work.

BENCHMARKING BENEFITS

Some of the benefits to companies that pursue this measurement approach include:

- Improving performance in areas that are critical to operational success
- Allows improvement objectives to be constrained by what has been and what is achievable in other areas of the business or industry
- Targets are tangible and realistic, and they can be used to generate competitive tension between teams and projects to further incentivize performance
- Indicates where performance compares with best practices, focusing attention on areas where it is most needed
- Provides assurances that work delivers value for the owner and the public at large (in public works)

SUCCESSFUL CHARACTERISTICS

What does it take to execute successful benchmarking? Benchmarking requires a straightforward set of requirements.

1. *Planning*—Define the boundaries of what needs to be improved and why. It is important to align these improvement objectives with any overarching organizational initiatives to ensure that incentives and goals of stakeholders are aligned.
2. *Selection*—Establish what areas of organizational performance need to be improved, and make sure that these are important to both you and your customers. Further define what you are assessing against. Comparable entities must be appropriate, and any differences in performance expectations must be clearly understood and communicated.
3. *Data collection*—Consider the means for data collection, in terms of level of effort required, data accuracy, issues around population size and statistical significance. Make sure that your data collection approaches are appropriate and repeatable. Having collected the data, then assess performance gaps.
4. *Action*—Having measured, then establish performance improvement plans. Targets and plans established as part of benchmarking should be simple, measureable, achievable, realistic and time-phased (S.M.A.R.T.).
5. *Review*—Monitor performance improvements against targets and constantly assess progress toward the desired end-state. Constant realignment against S.M.A.R.T. targets can aid progress.
6. *Management support*—Management must support benchmarking efforts and the required changes. Providing feedback on benchmarking efforts is critical to engage participants and maintain the morale of your team.

BARRIERS TO SUCCESS

The following are a few things to avoid when pursuing a benchmarking strategy.

- Limit the number of business areas or elements that are being benchmarked.
- Enjoy initial success, then scale to different areas of the business.
- Assure that every benchmarking activity improves performance in an area that is business-critical to maintain focus and emphasis.
- Be precise in what is being measured, and assure rigor in the measurement and validation processes.
- Be flexible. Organizational priorities change, and your focus on benchmarks and targets can change with them.

BENCHMARKING TECHNOLOGIES

Traditional processes for gathering labor production and performance data are time-consuming and often fail to measure performance at an appropriate level of detail. Mobile technology and integrated software solutions can improve field-data collection, empowering operations analysis at a more granular level. By measuring accurately, identifying performance issues can become a routine part of management. **CBO**

Guy Skillett spent 10 years working for Bechtel in a variety of roles in Qatar, Albania, Guinea, Canada and northern Chile. Presently working with Rhumbix, he is dedicated to helping construction firms improve labor performance through the deployment of mobile technology and process improvement. Contact Skillett at guy@rhumbix.com. Visit rhumbix.com.

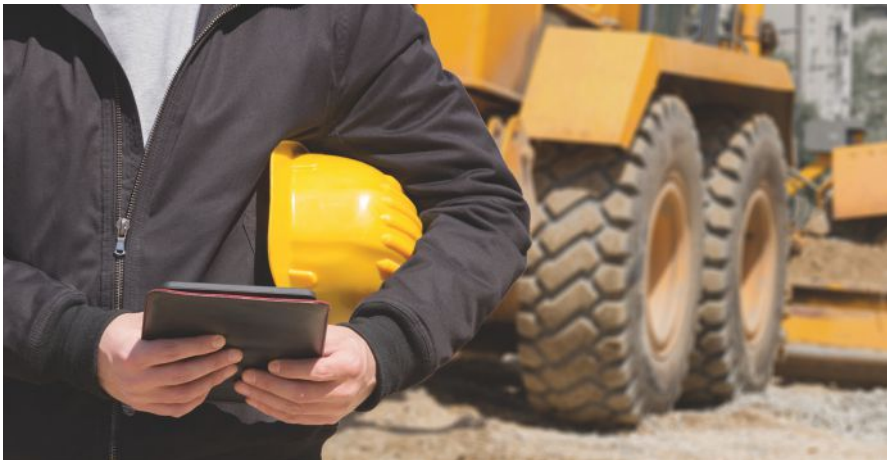


How Real-Time Data Prevents Big-Time Fines

Digital transformation in the wake of OSHA fine increases

BY JAMES ROBINS

Employees operating heavy machinery know the dangers surrounding working with tools, many of which have the ability to scorch, cut and tear metal in an instant. Unfortunately, simply knowing the dangers doesn't mean that accidents won't happen. The best way to prevent accidents is by ensuring that employees have the instruments and information they need to handle machinery with caution. As companies are still adjusting to the OSHA fine increases that went into effect on August 1, 2016, there is no doubt that equipment manufacturers and construction companies of all sizes will continue to be affected by the new rules. Companies of all sizes should be concerned, considering a serious violation penalty, which was originally $7,000, jumped to $12,600 once the new rules went into effect, and willful and repeat violations went from $70,000 to $126,000 per violation.



The new maximum penalties haven't been raised since 1990, and must now account for inflation in accordance with the Federal Civil Penalties Inflation Adjustment Act Improvements Act of 2015. As the new rules and fines went into effect, North American equipment manufacturers and construction companies had to act fast to ensure OSHA compliance. Unfortunately, it is likely that not all businesses caught up in time, and could risk paying significant fines down the road. Thankfully, mobile technology can help streamline processes and address some of the biggest issues companies face as they try to adjust to the new rules.

EFFECTIVELY COMMUNICATING JOBSITE HAZARDS

As one of the top OSHA violations cited by the National Safety Council, hazardous chemicals have the potential to cause serious safety hazards in the workplace, and are a problem for many. With an estimated 70,000 chemical products used, imported or produced in the United States, Americans are exposed to chemicals on a daily basis. This is why it is imperative that equipment manufacturers get the information they need to inform and train their employees. By adopting real-time, mobile checklists, equipment manufacturers and construction professionals can empower their own employees with the necessary tools to remain safe and injury-free in the palm of their hands. On-the-go compliance has the potential to create a safer workplace, and it is a cost-effective and essential part of early preparation.

INCREASING SUCCESSFUL LOCKOUT/TAGOUT PROCEDURES

The lockout/tagout inspection is vital to tracking the proper safety handling of hazardous energy sources, and is used to ensure that industrial machinery is properly shut off and not restarted until maintenance or service work has been completed. Lockout/tagout protects the health and

safety of those who work around industrial machinery and equipment. Ignoring proper lockout/tagout procedures can mean the difference between life and death for equipment manufacturers and employees. By deploying a digitized checklist app, employers can ensure their workers are all working from the same, real-time information and have a clear route to success when handling the energy transfer process. Instead of relying on paper checklists, going mobile is an easy solution for staying on track when dealing with electrical, mechanical, hydraulic, chemical, thermal and other sources of energy used in the manufacturing process.

MACHINE GUARDING IN REAL TIME

Safety checklists are only as good as the person filling them out. When it comes to machine guarding, if information about equipment remains lost on paper, it is not helping anyone. It's even worse if the person is rushing through his/her procedures, which could lead to employees tripping on-site, or worse, losing a limb.

Considering the rate of amputations in the manufacturing sector is 1.7 per 10,000 employees, following proper procedures is important. Data can be an invaluable asset in machine guarding, and is especially important when it comes to preventing harmful and potentially lethal accidents from happening. By tracking and consistently evaluating processes and procedures in real time, equipment manufacturing teams can instantly share corrective actions that need to be taken to ensure they are not only staying OSHA compliant, but also keeping workplace injuries at bay. There is a lot at stake when it comes to preventing the OSHA compliance fines, and one of the best ways to ensure the safety of your machines and your employees is through regular safety inspections. Forms often get lost or forgotten, and the biggest mistakes happen when someone is tasked with retyping information from paper forms into a software or database program. Mobile technology provides the means to instantly collect, share and learn key compliance details in real time to stay up to code and improve operations. Once a form is digitized, all employees have access to it, regardless of location or time of day. **CBO**

James Robins is the chief marketing officer for Canvas. Robins has held leadership positons in some of the world's leading global brands, including Orange, Automobile Association, Myriad Group and NEC. Over the past 10 years, Robins has built 100M+ customer bases and cutting-edge solutions that have delivered 4B software installations that transform how people live and work in an increasingly connected world. Visit gocanvas.com.





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STATE OF THE INDUSTRY



Trends & changing barriers your business will face this year

By Hank M. Harris



2017

All things relative, 2017 finds the construction industry doing quite well. The industry has largely recovered from the Great Recession and is moving forward. Construction in the United States has historically been considered a highly cyclical activity. Beginning in about 1991, suddenly, cyclicality seemed suspended. The tech bubble and the associated recession of 2001 were not felt by most industry enterprises.

Generally, the entire industry had an unprecedented up cycle that lasted from 1991 until 2008. Our view is that this kind of extended up cycle is not likely to repeat itself. So, what the industry is experiencing right now will not last forever, but it will probably be several more years before the construction industry faces severe headwinds again. We believe this projection will hold, even in the face of a likely U.S. recessionary period in the near term.

The construction industry generally constitutes somewhere between 6 to 9 percent of gross domestic product. In 2008, this was approximately 9 percent, whereas in 2016, it was only 6 percent. The question arises as to whether the industry has lost its place in the broader economy. However, half of this percentage reduction is attributable to housing, which has been an anemic part of the overall recovery. One of the reasons that this economic recovery has never "felt good" for the public is because it is the first time in modern history when an economic recovery was not led by housing. That has been highly contributory to the unstable and uneven recovery pattern that we have seen since 2008.

Put-in-place construction has returned to almost $1.2 trillion, which was where the industry left off in its 2008 peak. Momentum in the industry is good & most markets are experiencing positive growth.

However, put-in-place construction has returned to almost $1.2 trillion, which was where the industry left off in its 2008 peak. Momentum in the industry is good, and most markets are experiencing positive growth. Over the long haul, the industry only grows at an inflationary rate. In 2015, the industry experienced 11-percent growth, which indicates that we were on the "ramp-up" part of the cycle. We expect growth for 2017 to cool to about 5 percent. So, the growth rate may be decreasing as we move forward, but it is still positive. Most vertical markets are growing at anywhere from an inflationary rate to rates as high as 7 to 8 percent. There are a few shrinking markets, but they tend to be the exception.

The industry is being buffeted by a number of important macro-level trends. These trends have already reshaped the industry and will continue to do so in 2017. While there may be some short-term pain for some industry players adjusting to the impact of these trends, they are likely to lead to an improved industry structure. This will have a net effect of improving conditions for most companies. Technology applications continue to proliferate, as do changes to delivery methodologies and various innovations improving the productivity and efficiency of the construction process.

While these phenomena are not new, both technological innovations and delivery innovations are accelerating at such a pace as to make it a challenge to keep up with the possibilities. The U.S. economy is in a state of revolution, probably analogous to the industrial revolution of the 1800s. The U.S. construction industry is as well. The next 10 years should see dramatic changes and improvements in how work is done. These same changes are also likely to change the roles of various industry service providers, and very likely will reorder the "food chain" of service providers.

Societal and demographic changes will be altering the context in which the industry performs. The millennial generation is the new driving force in society, and will continue to be so for the next 20 years or so. To the extent that they become involved in design and construction-related matters, millennials are probably going to be less accepting of construction's status as a "laggard" industry.

It will also be virtually impossible for them to reinvent the experience of their forbearers before taking the helm of decision-making roles. Millennials will most likely be driving and demanding changes in the way business is done, most of which will likely be positive.

The overall economic indicators in the industry are sending positive signals. The *Engineering News-Record* Top 400 Contractors tend to increase their market share during recessionary periods, and this past recession was no exception. In 2010, the Top 400 Contractors performed over one-third of the market, or 35 percent. This was still at 32 percent at the end of 2015. The good news is that contractors of all sizes have seen margins return, as have engineers, designers, materials providers and other industry players.

Using contractors as an example, general builders averaged a pretax, net profit of as low as 1 percent at the height of the recession, and that average pretax net profit is now reported at 2.5 percent. The margins of specialty trade contractors, heavy highway and heavy civil contractors are ranging from 4 to 6 percent and even higher. Of course, even in good times, no one ever thinks that the margins are high enough. However, the returns on capital employed in the industry can be quite strong. Return-on-capital metrics are generally one of the best pieces of economic rationale associated with many companies in the industry. For those who can manage and mitigate the risk, the returns are at levels that are difficult, if not impossible, to find anywhere else. Reported average returns on equity capital now are ranging from 18 to 30 percent. Of course, they should, given the risk involved.

More than anything else, construction industry activity is driven by population trends. We continue to see general migrations of people to the Southeast and to the West. We have also identified 10 megapolitans that exist throughout the U.S. These tend to be large, mostly urban areas that benefit from population density, intermodal transportation access and, in most cases, access to deep-water ports. We are also seeing a significant migration of midsize and large, self-performing, union contractors looking to move to different geographies, where they can set up merit or open-shop companies. There has been some continued erosion of union activity around the fringes of certain large cities, such as New York. However, for the most part, the union/nonunion picture remains relatively static.

We estimated that 2016 closed with power, highway and street and education being some of the largest volume sectors put in place. On a percentage basis, lodging, office, amusement and recreation and power will all do well. Some of the weaker percentage markets include public safety, water and wastewater.

From a macro view, the market trends are generally good. Most forms of construction are underfunded, and, therefore, undersupplied, and have been for some time. As a result, we see few examples of supply/

demand imbalances, and thus a positive, intermediate-term outlook.

Of course, our world remains in a state that the military refers to as "VUCA," which stands for volatile, uncertain, complex and ambiguous. Despite this overall context, we see certainty in many of the trends impacting the world as it relates to construction activity. Globalization is one such trend. Design-related activity is most easily transportable, and cross-border activity in that world continues unabated. The entry into the U.S. market of foreign contracting enterprises has now been going on for 25 years, and increasing over that time. While we see more U.S. contractors participating in international markets, the impact on the U.S. construction industry by foreign entrants is perhaps the most significant trend overall.

We now have 7 billion people on planet Earth, and this is projected to grow to 9 billion by the year 2030. The U.S. will have commensurate gains in overall population. The rise of the middle class and the continued movement of population to urban centers are global trends, but also very specific in their impact in the U.S. market.

Most of the foreign companies that have entered the U.S. are very large, multibillion-dollar, global corporations. Combined with the rise of more megaprojects in both infrastructure and building, the impact of these companies has been, in effect, to stratify the U.S. construction industry. The industry has always been highly fragmented, and its essential disaggregation does not really make it possible for it to be consolidated, in the pure sense. Too few forms of construction have significant entry barriers to facilitate consolidation.

What has happened, though, is what we call bifurcation; a trend that has, in effect, restructured the industry. We now find a situation where at one end of the market, scale actually matters because of what large corporations can bring to bear in terms of intellectual capital, service optionality and the ability to provide turnkey project delivery. On the small end of the market, there continues to be localized and nimble companies that can compete effectively. There will continue to be midsized companies, although we expect that there will be fewer of them and they will be more challenged in their overall ability to develop a competitive strategy and position.

Sustainability and green building-related trends will continue. Designers and owners are all keenly interested in this area and, of course, drive many decisions in the industry. The emerging millennial generation is attracted to environmentally friendly causes, which will keep the interest in developing this trend at a high level. Technology and productivity improvement initiatives will combine. The import of lean manufacturing principles into the construction process is an example of the ongoing interest in better delivery.

Future delivery of design and construction will also take place in a dramatically changed societal context. Most baby boomers grew up in an era of the "traditional" household, in which fathers worked and mothers generally stayed at home to take care of children. Today, only 7 percent of U.S. households operate that way. Almost half of today's workforce is single, and almost one-third of all homes have only one person living in them. In various forms of professional endeavor, such as law and medicine, females make up over half of the degrees awarded. The construction industry is lagging here, but we expect that diversity will be increasingly on the agenda of companies, and that the composition of the workforce will finally begin to demonstrate this over the next decade.

One of the most significant phenomena at play in construction right now is the mass wave of retirement facing the industry. Owners of many firms are reaching the ages where they need to consider their exit strategy and/or what will happen to their companies. As an industry, we have to be asking: "Who is going to own, lead and manage design, construction and related enterprises 10 years from now?"

We see a dramatic failure to plan adequately for these issues, especially in the midmarkets and in the smaller end of the market. It is surprising how large some of these companies can become without having a well-addressed, viable plan for the orderly transition of ownership and succession of management. Selling construction-related businesses to a third party is actually not possible for most firms. The vast majority of firms are well served to develop an internal transition plan. In our experience, these plans take at least a decade to be developed and thoroughly implemented. Because this planning is not adequate in many places, we expect that the next 10 years is likely to see numerous liquidations, especially on the small end of the market.

Almost 40 years ago, revered Harvard management strategist Michael Porter published what he called his "five forces" of evaluating industry attractiveness. Barriers to entry, bargaining power up the food chain and down the food chain, degree of rivalry and how easily an individual firm can be substituted were forces that determined industry attractiveness.

We believe there is an emerging scenario where many of these forces may be improved because of industry restructuring. Improved overall structure could mean a brighter future for the U.S. construction industry long term. Meanwhile, short-term conditions are good, and we believe they will stay that way for a while. As the old saying goes, this is a good time to "make hay while the sun shines." **CBO**

As the chairman of FMI, Hank M. Harris is responsible for the management and governance of the firm's board of directors. After being the CEO of FMI for the maximum number of years in the firm's bylaws, Harris assumed the executive chair role. He now consults for firms in matters of organization, strategic planning and the execution of strategic plans through mergers and acquisitions. Harris has consulted with a variety of industry players, and his advice is sought by engineering, contracting, EPC and related industry firms. He is a certified management consultant and a member of the American Arbitration Association and the Consulting Constructors Council of America. He participates in the Institute of Management Consultants and the Association of Management Consulting Firms. Visit fmi.net.





TRUMP & TECH

2 changes to the construction space that will significantly affect your company in 2017

BY ELIZABETH MANNING

The new year ushers in many changes for both the construction sector and the United States economy overall. Business owners are looking to many different sources, including President-elect Donald J. Trump and a broad swath of new jobsite solutions, to plan their strategies for 2017 and the near future.

A NEW COMMANDER IN CHIEF

According to a recent report by Dodge Data & Analytics, forecasts predict Trump's election to be a plus for the construction industry. The report cites Trump's experience in construction and his many ties to the industry as factors that will play a strong role in putting new project starts and beneficial legislation at the forefront in 2017. However, shrewd construction business owners will be cautious in early 2017, even if there is a potential for great gains in the industry. Rick Keegan, president, construction, Travelers Companies Inc., said it is correct to think the actual impact of Trump's presidency is still very much to be determined. "Construction is watching very closely to see how much of what was discussed on the campaign trail will actually come to policy," Keegan said. "There is no question that there is a pent-up demand for infrastructure work. A robust plan would be well-received by the construction industry."

According to Keegan, while the private sector is still in slow recovery mode and could benefit from things like lower corporate taxes and streamlined business regulations, the public sector stands to advance the most from policy changes.

The Dodge report mentions Trump's latest proposal, a $550 billion plan to be invested in public infrastructure projects over several years. This plan, still in its infancy, would bring many opportunities to business owners working in the public sector. A probable increase in infrastructure projects could have negative consequences on other issues in the industry, though.

"The availability of skilled labor has been a real challenge over the past several years. A potential uptick in activity could only exacerbate the issue and make the labor pool smaller. Our customers are actually turning work away because they can't staff the crews needed—and this includes leadership," Keegan said. Keegan mentioned three prevalent

changes to the industry that would be disruptive in 2017 and beyond: assimilating new employees to the workforce to alleviate the skilled labor shortage, auto-related claims and a reinforced need for robust cybersecurity. With a president-elect who proposes a major increase in new construction, you need the necessary tools to stay competitive, and that includes embracing technology solutions for your jobsite.

THE JOBSITE OF THE FUTURE

A shift to a more technology-driven jobsite will continue in 2017. New solutions from manufacturers, as well as regulations for operating those solutions, will increasingly define how contractors are attracting talent and completing the project process. One set of regulations in particular, the FAA regulations for commercial unmanned aircraft systems (UAS) use, released in late 2016, will provide new opportunities for streamlining your project workflow. 3DR Director of Products Dan McKinnon said 2017 will be the year that enterprise UAS users will truly begin to scale their pilot projects.

"However, in order to do so, capture and analytics must be standardized from user to user and jobsite to jobsite," McKinnon said. "Capture and analytics must become so easy that every member of the team should be able to walk through the basic workflow." To make this happen, many manufacturers are partnering to create integrated systems to share data from technology solutions, such as drones, directly to BIM tools. A general theme exists in incumbent tech solutions for the jobsite: ease of use for anyone on the jobsite. The new FAA regulations for drone use are no different. The current exam for pilots is much easier, according to McKinnon.

"The FAA currently does not test for practical knowledge or piloting skill. Look for study guides and materials, and I would recommend studying for 10 to 20 hours for the test," McKinnon said. Drones are just one of the many solutions that will be paramount to staying competitive in the construction space in the coming years. As for President-elect Trump, Dodge Economist Robert Murray expects that a true idea of what to expect in 2017 regarding presidential plans won't emerge until January or February. However, you can be preparing for upcoming changes now by focusing on what you know. Tech solutions will continue to entirely transform your jobsite and the way you get work, attract the new workforce and plan for new projects.

Much of the future of construction will be decided in how business owners work to revolutionize both the way projects are completed and the reputation of the industry as one of growth and innovation. CBO

Elizabeth Manning is the managing editor of Construction Business Owner *magazine.*



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WORKING TO REDUCE THE RISK

2016 insurance market observations & predictions for the new year

BY KATHY WELLS

Currently, the construction insurance marketplace, excluding health insurance, proves to be a favorable environment for the insurance buyer. According to industry experts at risk management and commercial insurance brokerage firm Cavignac & Associates, in 2017, most business owners will be able to negotiate flat rates and some businesses may even see rate reductions.

Analysis of United States Bureau of Labor Statistics data released by Associated Builders and Contractors (ABC) last month reported that the U.S. construction industry added 19,000 new jobs in November 2016, and has now added jobs for 3 consecutive months. ABC also reported that industry employment is up by 2.4 percent on a year-over-year basis, estimating that employment growth would likely be much sharper if more suitably skilled workers were available to fill job openings.

Chris Larmore, CIC, GBA, CRM, PHR, CRIS, CEO of Red Cedar Insurance Agency, a construction risk management consulting and commercial insurance firm, predicts, "The skilled labor shortage will continue, and it is going to be a long-term barrier in construction."

Larmore believes that the skill shortage has led to an increase in workers' compensation claims and employment practices claim, as contractors are forced to hire from the shallow end of the labor pool. "Ideally, there will be a shift in perception, and high-school programs will begin to work with the trade programs to train kids into high-paying construction jobs," Larmore said. "The demand for construction workers is positioned to remain high, which will translate into gradual reduction in industry unemployment and significant wage pressures," said ABC Chief Economist Anirban Basu. Despite the generally elevated levels of demand for talent, the construction unemployment rate remained unchanged at 5.7 percent in November 2016.

While employment is on pace, construction insurance continues to be dynamic. State by state, workers' compensation and liability rates fluctuate, as state laws and litigation regarding construction defect and workers' compensation payouts heavily impact rate movement. "The insurance market is currently very soft, which means rates are more negotiable than usual, and carriers are working harder to get business," said Larmore. He predicts that rates will continue soft

through 2017, giving business owners the opportunity to protect both their businesses and their bottom lines. According to Larmore, the biggest challenges that contractors faces when it comes to insurance and risk are fraudulent and overinflated workers' compensation claims. It is estimated that over half of workers' compensation claim dollars are either inflated or fraudulent. When looking to improve an existing risk management plan to protect against such problems in 2017, Larmore advises that "business owners can implement proactive, data-driven claims management, careful hiring practices and return-to-work programs to help prevent the abuse."

Technology continues to make its mark in construction, but what kind of impact will it have on risk? Greg Mason, vice president of construction at Generali Global Corporate & Commercial U.S.A., a global practice focused on providing builder's risk solutions, sees benefits to the use of technology in construction. "Wearable technology that tracks workers' movements through a jobsite over time can facilitate claims investigations. The use of drones to monitor progress of a job remotely—even globally—has also gained a lot of attention," Mason said. On a smaller scale than workforce wearables, the app arena also benefits the progress of insurance claims. "The use of apps as a means to increase efficiency is necessary and inevitable. When efficiency is increased, risk is reduced," said Mason.

One area in which business owners might be less than protected is cyberrisk. According to Jeff Cavignac, managing principal of Cavignac & Associates, "Cyber coverage is the fastest growing insurance product, but it is still underpurchased. Every business has cyberrisk. Managing these exposures goes beyond locking down your computer systems. Cyber extortion and social engineering, among other types of crime, continue to grow," Cavignac said. The risk for exposure to cybercrime is at an all-time high, and as technology continues to influence every sector of our lives, business owners should invest in protection. According to the Symantec Corporation, 2015 produced a record-setting total of nine mega-breaches, and the reported number of exposed identities jumped to 429 million. "Every business owner should consider cyber coverage. The application process—even if you don't buy the insurance—will serve as a self-audit on your exposures and alert you to areas that can be improved," said Cavignac.

While it is important to understand the insurance market and its effects on your business, unfortunately, you can't do much to change it. "The market is the market. What you can control is how your company manages risk. Risk management is market agnostic. It needs to be front and center all the time," said Cavignac. **CBO**

Kathy Wells is the editor of Construction Business Owner *magazine.*



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Conventional & Reduced-Tail-Swing Crawler Excavators

Evaluate criteria to purchase the best excavator type for your company

BY AARON KLEINGARTNER

Most contractors would agree that crawler excavators are a staple product in any construction company's fleet. These machines regularly handle the heavy digging, lifting and loading in a variety of construction applications. There are two tail-swing types: conventional tail swing and reduced tail swing. So which one is best for you? There are several key factors that may influence your choice between conventional-tail-swing crawler excavators and reduced-tail-swing models. You may be able to improve your jobsite productivity by closely evaluating your typical jobsite conditions and implementing a reduced-tail-swing machine into your construction equipment fleet.



The most common excavator type is a crawler excavator with a conventional-tail-swing configuration. Conventional-tail-swing excavators have a rear counterweight profile that extends beyond the machine's steel tracks when the house rotates, optimizing performance in digging, loading and lifting applications. However, some manufacturers offer excavators with a shorter/reduced tail swing to work on confined jobsites without sacrificing performance. A reduced-tail-swing excavator configuration is ideal for working in limited or restricted spaces, since the machine's counterweight profile typically extends inches, rather than feet, beyond the machine's tracks. Before selecting a conventional or reduced-tail-swing excavator, you should consider the following: typical jobsites, key machine specifications, attachments, machine efficiencies and maintenance considerations.

JOBSITE LOCATION

Excavators are routinely operated on a variety of small- and large-scale construction projects. It is important to properly match your machine to its work to maximize productivity. Conventional-tail-swing excavators are most often operated in excavating, grading and site development, where space constraints are not a concern. They are also commonly used on infrastructure commercial building site projects to load material into trucks. However, it is not always possible to put a conventional-tail-swing excavator on every jobsite. In many cases, space is limited and your crews and equipment are maneuvering around several other pieces of equipment or permanent structures. For these reasons, excavators designed with a reduced-tail-swing configuration are gaining popularity. Reduced-tail-swing excavators are used primarily in congested urban areas, such as road and bridge construction projects, where traditional excavators cannot fit as easily. For example, the reduced-tail-swing radius may allow excavator operators to work in one lane of a street or highway without blocking traffic in the adjacent lane. Reduced-tail-swing

excavators are ideal when digging and backfilling trenches in a confined area.

The trend with reduced-tail-swing excavators is on the smaller side of the crawler excavator spectrum, typically between the 14- and 30-metric-ton size class. The smaller stature, coupled with reduced tail overhang, creates a popular combination for both transporting the excavator and operating it. Available as an option for some reduced-tail-swing models, the crawler excavators may be equipped with rubber track pads. This option may be popular if you are working on established surfaces to minimize ground disturbance, especially when compared with traditional steel tracks on crawler models. It may also save you and your crew time because you may not need to lay down plywood or other types of mats to minimize surface damage.

Dozer blades are another option available for some smaller crawler excavators. Simplify backfilling and use your excavator to fill, smooth and level trenches more efficiently. A smooth cutting edge on the excavator's bucket allows you to clean right up to the edge of the dozer blade, reducing further cleanup.

In addition, the design of the dozer blade is suitable for moderate site grading, reducing the need for other equipment to complete the task.

KEY SPECIFICATIONS

You should also review the machine's specifications and determine what configuration will meet your expectations. It can be difficult to narrow down the specifications of conventional and reduced-tail-swing excavators, but reviewing the machine's specifications is as fundamental to a purchase as a hands-on demonstration. Core excavator specifications that should be taken into consideration include:

- Arm breakout force
- Engine horsepower
- Hydraulic flow
- Lifting capacity
- Maximum digging depth
- Maximum loading height
- Maximum reach, ground level
- Operating weight

ATTACHMENT VERSATILITY

You may think conventional-tail-swing excavators are more versatile than reduced-tail-swing models. However, reduced-tail-swing excavators can be just as versatile when paired with the right attachments. In addition to standard buckets, three of the most popular attachments are quick couplers, hydraulic clamps and hydraulic breakers, which offer a low initial investment with a high rate of return. For example, clamps enable precise movement and positioning and help secure material for superior



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loading and material-handling applications. When not in use, clamps can be retracted, making the attachment excellent for demolition, site preparation and land-clearing applications, as well as when the excavator operator is using a lifting mode to lift and place materials.

MACHINE PERFORMANCE

Many excavator manufacturers continue to refine their designs and improve the optimization between the engine and hydraulic system for greater efficiencies and improved fuel economy. Some machines, both conventional and reduced tail swing, are designed with variable-speed-control technologies to reduce engine rpm during low workload requirements. This reduces the total energy required to perform a task and can measurably improve fuel efficiency. With pump torque control, your operators can effectively match a machine's hydraulic pump torque and engine response to the task, preventing engine overload and excess fuel consumption.

MAINTENANCE CONSIDERATIONS

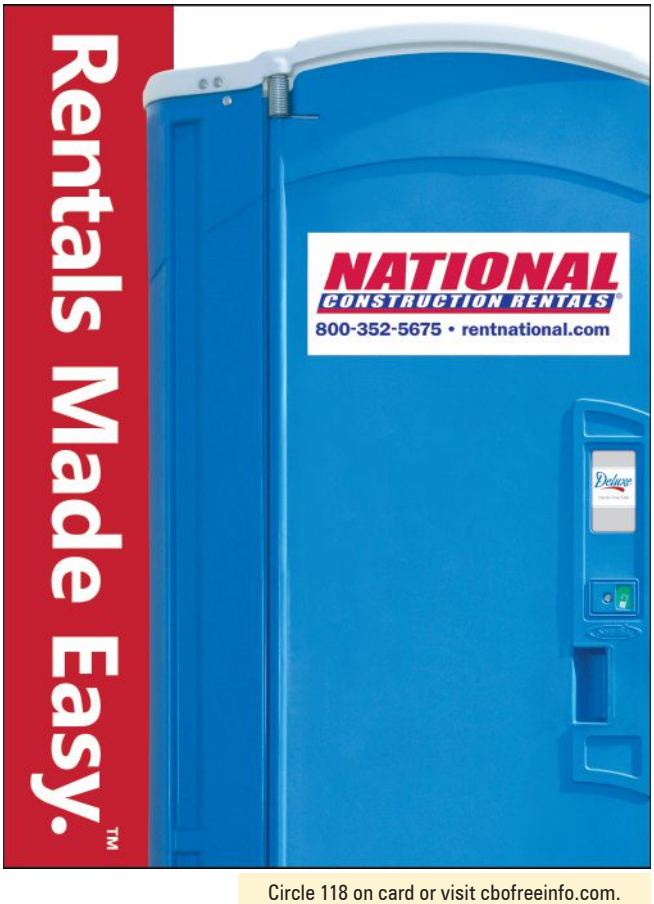
Both conventional and reduced-tail-swing crawler excavators have similar maintenance considerations, especially when used in construction applications.

Excavator owners should closely follow the maintenance interval schedule provided by the manufacturer in its operation and maintenance manual. As a general guideline, it is a good idea to clean your excavator on a regular basis, especially when performing service or maintenance procedures. Perform daily lubrication duties in addition to other key maintenance intervals recommended by manufacturers. It is also important to routinely complete a full undercarriage inspection for excessive or uneven wear. The tracks should also be inspected to see if any components look out of place. If so, this could indicate a loose trackpad or a broken track pin. Rollers, idlers and drives should also be inspected for oil leakage. Oil leaks could indicate a failed seal, which could lead to a major failure in the rollers, idler or drive motor.

The best method for comparing conventional-tail-swing and reduced-tail-swing excavators is to demo them side by side in your specific application. You should operate the two types of excavators in real-life applications, so you can better assess which tail-swing configuration will have the most benefit on your jobsite. **CBO**

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Constructive Confrontation

3 tips for successfully handling conflict on the jobsite

BY TOMÁS GARZA

To successfully navigate conflict on the jobsite, general contractors and project managers must be able to confront team members and stakeholders in a positive, productive manner. Whatever the situation—whether two people are actively quarreling or one person's behavior is impacting the entire project—an owner or manager must be able to step in and take charge, and do so in a way that does not contribute to the drama. How do you constructively confront team members? How do you get your point across and preserve team chemistry, all the while working to get the job done as quickly and effectively as possible?

For a general contractor or project manager, these conversations can be crucial.



As a manager attempting to put a stop to harmful or annoying behavior, you must be clear in this conversation. Your team cannot afford any mixed messages.

Ongoing conflict and drama can have a ripple effect on the entire team, and the last thing any project needs is a dip in morale. Assuming this is not a situation that calls for dismissing someone from the project, a general contractor can take several steps to help resolve the problem and preserve group harmony. When having these conversations, keep the following tips in mind.

1. USE NON-ACCUSATORY LANGUAGE

For many of us, it is tempting to place blame and pin an entire problem directly on others. After all, aren't they the ones causing the disturbance in the first place? A constructive solution—despite first impressions—involves shelving the initial urge to blame and taking a step back.

How you phrase your discourse makes all the difference. You can make the conversation productive by focusing the language on you. For example, you can say, "I notice you showed up late the last 2 days," or, "The other day, I overheard your comments about the architect." The alternative would look like this: "Hey, you were late the last two days," or, "You made those comments about the architect." One statement talks about your observations: what you saw, noticed or heard. The other puts everything squarely on the person you are confronting.

This may seem to be a subtle matter of semantics, but in constructive confrontation, your word choice matters. When you talk about your observations, people naturally feel less defensive. When people do not have their guard up, you will get more accomplished overall.

2. BE CLEAR

As a manager attempting to put a stop to harmful or annoying behavior, you must be clear in this conversation. Your group cannot afford any mixed messages. Be as clear as you can about the following:

- *What you heard or saw*—Avoid ambiguities. If you didn't experience any of the events firsthand, be sure you have gathered sufficient information. The person you are talking to needs to know exactly what he/she is doing to damage your group chemistry.
- *How this impacts the group and the project as a whole*—Be clear on this. Often, people do not intend any sabotage, but their behavior may, nonetheless, have a detrimental impact. Be direct about this impact.
- *Your expectations*—If you don't clearly state your expectations for future behavior, this conversation will be a waste of your time. Unclear expectations create needless confusion and can lead to future problems. As a business owner and manager, you must say what you expect. Luckily, this can be done in a non-accusatory manner that strengthens the crew, rather than pulling it apart.

3. DON'T FORGET TO LISTEN

A conversation, even one you must have with a team member about his/her behavior, is just that—a conversation. This means it involves two people. Though you will need to approach the dialogue with an agenda to get your point across, the process will be infinitely more productive if you give the other person a chance to speak and, more importantly, to be heard. This means you must take the opportunity to listen.

When the other person is able to speak and feels you have heard him/her, you relieve much of his/her tension. Defensive posturing that might otherwise stand in your way will disappear. The person may even feel appreciated and grateful that you took time to hear his/her perspective. This can be crucial to maintaining group harmony. Provided you take the opportunity to clearly state your expectations, you have nothing to lose in taking a moment to listen.

If you listen attentively enough, the other person may offer suggestions or solutions you had not considered. You will never know unless he/she gets an opportunity to speak.

Consider these three tips the next time you have to confront somebody on the job. In most situations, you can preserve group harmony, show respect and appreciation for the other person, and be sure you have clearly stated your expectations.

Becoming a true professional at constructive confrontation is possible, and if you do it, your projects will proceed with minimal drama and hassle. You, your business and everyone connected to your work will benefit. **CBO**

Tomás Garza is a conflict resolution and personal development expert with more than 12 years of experience. Garza has served on the faculty of Portland State University and is a former board member of the Oregon Mediation Association.



Conquer Poor Ground Conditions

Protect crews, equipment & the environment with composite matting

BY BILL MINIAT

Over the past several years, market research has shown the increasing use of composite matting on a variety of projects and applications, including to create temporary roads and work pads in challenging environments. Research points to an uptick in demand due to the advances in composite matting technology and manufacturing that produces a cost-effective, reliable product. In addition, the use of composite matting has grown alongside our global culture's heightened awareness and protections of employee safety and the environment. Today's advanced, engineered composite matting systems help mitigate risks to equipment, personnel and the environment, while increasing the bottom line.



COMPOSITE MATTING

Composite access mats are specifically designed to provide stable, fail-safe, temporary roads and working platforms for vehicles, equipment and personnel over any type of ground condition. They are typically made from HDPE (high-density polyethylene), which allows the mat to bend without breaking and to conform to ground contours, while providing tremendous strength and resiliency. Composite mats are 100-percent recyclable and are an ideal low-cost, environmentally-friendly ground protection solution. The mats maintain strength when wet, prevent vehicle slippage, increase worksite safety and provide companies with long-term cost savings, while simultaneously reducing the time and hassle associated with worksite preservation. Because composite mats are made of plastic, they have a weight-bearing load that is more than double that of wood.

But, much more than just better functionality, composite mats are designed to be safe. Mats are produced without nails or screws, eliminating the dangers of employees being punctured through their boots and flattening tires. Composite mats lock together to form one solid and continuous road or platform, therefore eliminating the possibility of individual boards coming loose and puncturing the underside of vehicles. Their surfaces are patterned for protection against slips and improved traction for both workers and equipment. The specially-formulated composite material is nonconductive to avoid problems with static electricity. While composite mats are lightweight and easy to transport and install, they are also durable (12 to 15 years) and require little maintenance.

Environmentally, composite mats are a much more responsible solution due to their nonabsorbent material, which allows for easy decontamination at the end of the project, meaning crews can prevent

chemicals and other materials from entering the environment on the next project. Advancements in materials, design and manufacturing have led to the creation of a high-quality product that can be used in a myriad of applications, conditions and environments. Composite mats can be used to create anything from temporary roadways for remote utility repair to parking areas for a construction project.

Compare & Contrast

PROS	Composite Mat	Timber Mat
Is environmentally friendly	Yes	No
Contains recycled content	Yes	No
Features treaded traction surface	Yes	No
Has a connection system	Yes	Yes
Absorbs water	No	Yes
Has cheaper initial cost	No	Yes
CONS	**Composite Mat**	**Timber Mat**
Causes safety hazards	No	No
Can rot/termite damage	No	Yes
Warps when wet	No	Yes
Could contain arsenic	No	Yes
Becomes heavier when wet	No	Yes
Loses strength when wet	No	Yes

A SAFER JOBSITE

A jobsite is a dangerous place when it is not equipped with the right materials. Risk of liability and personnel, heavy-duty machinery, and the worksite can be costly. In addition to the immediate risks, a single accident can happen and companies are at risk of losing time and money in production and individual and class action lawsuits. Damage to a company's reputation and brand are less quantifiable, but just as real.

In addition to creating a safe jobsite for crews and equipment, a safe environmental practice is good for the planet and good for business. Trees are a natural resource that can take up to 60 years to be regrown, so it's important to be conscientious with the use of them. The cost of cross-contamination is a major concern to all companies. New rules and legislation are being implemented to protect sensitive areas against preventable contamination. Currently, in Western Canada, oil field work trucks are required to be washed top to bottom before they are permitted to go to another jobsite.

WOOD MAT HAZARDS

Wooden mats have been in use for years as a cheap, readily available solution to create a temporary road or work area, especially in soft, unstable or sensitive ground conditions. But wood mats are fraught with hazards and problems. Initially, wooden mats are economical, but because of their short lifespan and high-maintenance requirements, they can prove to be costly in the end. The life of a wood mat is short (2 to 3 years), as they warp, rot, splinter and break down over time. Environmentally, since wood is highly absorbent, these mats will retain contaminants that can be transferred to other projects. The potential hazards of cross-contamination can be lethal to sensitive environments and have become an increasingly important consideration for engineers and project managers. Complete cleansing of wood matting is impossible. Often, these mats end up in landfills or are burned. These non-sustainable disposal practices can have a deleterious effect on the environment.

THE MARKET SHIFT

Composite mats have been used in the oil and gas industry as drill pads since the 1990s. It is only in the last 10 years that composite matting has been used as an alternative to wood mats in other industries. Composite mats offered critical advantages over wood, including easy access to remote locations and sensitive environments, regardless of climate and weather conditions. Composite mats are a good solution for any project because they offer protection for the ground from chemical spills and other toxic liquids. These mats are excellent when working in ecologically sensitive areas, such as wetlands, or when working on coastal sand, marshy and muddy surfaces and other unstable ground conditions. Composite mats eliminate common problems found with timber mats, such as rot, insect infestation, warping and board breakage. As of 2016, 12 percent of the matting market is comprised of composite matting products, and that number is steadily growing. Over 20 different industries rely on composite matting for temporary roads or working platforms, including construction, utilities, pipeline and alternative energy.

SIGNIFICANT SAVINGS

Composite matting is generally more expensive upfront, but it is more cost-efficient due to its durability and stability. Since composites weigh less than wood mats, more composites can be loaded onto a truck—resulting in a larger working surface area per truckload, reduced number of transport trips per project, reduced fuel consumption, reduced greenhouse gas emissions per project and reduced transport costs per project. Reducing truckloads not only saves your company money, but it is also good for the environment. **CBO**

Bill Miniat is the director of business development, industrial and military and disaster relief for Signature Systems Group. Visit signaturesystemsgroup.com.



The Compacted Road to Success

5 questions to help you find the best fit for new compaction equipment

BY ANGELA ELLINGWOOD

Compaction equipment is not always the most favorite equipment on the jobsite, but it should be. Soil compaction is a critical component in construction. Compaction reduces the voids in the soil material to create a solid foundation for the project, and it ensures the durability and stability of the structures being supported. Proper compaction means increased load-bearing capacity, higher density of the soil, reduced water permeability and elimination of frost damage. Often, the structural failure of projects and the damage caused by foundation settlement is due to improper soil compaction. Therefore, buying or renting the right compaction machine is paramount to the success of the job. Use the following questions to determine which investment will earn you the highest potential ROI.



1 WHICH MACHINE IS BEST FOR WHICH SOIL TYPE?

The two main soil types to consider when buying a compactor are granular and cohesive. Forward plate compactors, reversible plate compactors and vibratory rollers are best used for granular soils, since they operate by vibrating or shaking the particles into place. The size of the machine depends on the size of the particles. Smaller particles require higher frequencies and may have lower compaction forces, while larger particles require lower frequencies, but have higher compaction forces.

2 HOW CAN I SAVE ON LABOR?

Becuase labor makes up the largest portion of the variable cost for most jobs, it is wise to look at the details of the equipment to make sure operators are utilizing their time efficiently. Many contractors end up saving on the initial cost of equipment, but paying 10-fold in labor costs due to inefficiencies of product choice. The biggest advantage of using a reversible plate over a forward plate is time. Reversible plates are easier to maneuver, especially in tight corners. Also, larger machines have bigger engines and offer more compaction force and larger surface area of the base plate, making them faster than forward plate compactors. Find out if the machine comes with extension plates or if they are available at an additional cost. Plate extensions increase speed and productivity, but removing them can be important when working in tight spaces.

While a larger surface area is important when deciding between a reversible plate and a forward plate, beware of reversible plates with large, flat surface areas. The large, flat surface acts as a suction cup, preventing proper speed and grade. Some manufacturers have found that, on some models, reducing the surface area increases the speed. Just because the plate is larger does not always mean it is faster.

Another important factor regarding cost/productivity efficiency for a reversible plate would be a service indicator, which lets you know when there is an issue with the machine. Some larger reversible compactors offer built-in systems, which inform users of important service-related issues. While frequent servicing of minor issues may be time consuming and hold up a job for a few minutes, it is nothing compared to the time that is needed should a more significant issue occur to the engine. Keeping that in mind, it is important to make sure that all maintenance points, as well as regular usage points, are easily accessible and can be repaired with ease, right on the jobsite. Another time-saver would be a compaction control meter, which can be found on some large reversible plates and helps the operator know when optimum compaction has been reached. However, make sure the meter is proven to create accurate measurements.

3 HOW CAN SAFETY CONCERNS IMPACT MY DECISION?

No matter what compactor you are considering buying, make sure the machine and operator will be well protected. These machines get beat up, perhaps more than any other piece of equipment. Checking to make sure there is a rugged protection frame surrounding the engine, as well as shock mounts throughout the machine, is paramount. Unfortunately, perception is sometimes reality, and operators assume the more they can feel the impact of the machine, the harder it is hitting. A good compactor ensures that the impact is going where it should go: into the ground and not into the operator. Ergonomics should be a priority with any piece of equipment. For compactors, this means that the guide bar should be lockable and adjustable to the operator's height.

Anti-vibration handles are available on some models, which also alleviate the stress on the operator. Power to weight ratio is an important factor when thinking of operator safety. Many people look for a compactor according to its weight, but what they should really look for is how much compaction force the machine gives out. It is best to find a compactor that weighs less, but has more power.

4 WHAT SHOULD I KNOW ABOUT MACHINE EXHAUST?

The exhaust should be located away from the operator, in the front of the machine and not on the sides, to avoid soot getting on walls during operation. To ensure better control and performance, make sure that with forward plates or reversible plates, the eccentric is built into the base plate. You will not have to worry about replacing bolts.

5 WHAT TECHNICAL ASPECTS SHOULD I CONSIDER?

The following points are other critical considerations when you are looking to purchase your next plate compactor.

A. Forward plates

- The size of the water tank saves you time in the end. Make sure you inquire about how much water the tank can hold and how it is mounted. Test whether or not the water really does end up on the asphalt and not on top of the plate. The closer the hose or sprinkler is to the base plate, the higher the chances the spray function will work. If you want to find out, hang the machine and turn it on. The vibration of the machine will show you how the water will flow.
- Wheel kits are a must, but if they are too thin and made of a low-grade plastic, they could end up being more of a hassle. Make sure the wheels are inflatable and wide enough to maneuver through rough terrain.
- Anti-vibration handle bars increase productivity and protect the operator.

B. Reversible Plates

Look for a compactor with hydraulic shift with infinitely variable speed—you only have to move the handle back and forth, making it safer and easier for the operator.

- Is the clutch self-adjusting?
- The throttle cable should be protected within the guide bar to avoid damage.
- Choose a compactor with a foldable lifting eye, so it is not in the operator's view and makes transport easier. Also look at the construction of the lifting eye to make sure it is sturdy.
- Does the base plate have flat edges so that dirt is able to vibrate off and not get stuck on the machine?

C. Rammers

- How many speeds on the throttle? Look for a machine with three speeds.
- Is there a strong steel protection over the engine? How is the visibility? The steel cover should be a separate component so the frame does not hit the engine when vibrating.
- What is the filtration system like? Can you check and change filters easily?
- Narrow bellows allow for longevity in narrow trenches.
- The base plate should be protected to avoid wear.

The most important thing is to do your homework. When seeking your next plate compactor, be sure to ask the questions listed above in order to be on a solidly compacted road to success. **CBO**

Angela Ellingwood is the marketing and customer service manager at Weber MT Inc. Ellingwood began as marketing manager in 2013 and became head of the customer service department in 2014. Visit webermt.de.



Keeping Up with Concrete Solutions

Look to organizations to satisfy training needs for your workforce

BY MICHAEL L. THOLEN

Quality construction depends, in large measure, on the skill of crews involved in the project process and the quality of materials used. Construction business owners are continually seeking to make operations more efficient and more competitive.

Investing in training and developing programs for current and new workers is crucial to ensure that your business is successful. Training provides employees with the knowledge they need to finish the job, using methods that ultimately result in a job well done and a satisfied owner.

Concrete pavements make up an integral part of the national primary and secondary highway system, farm-to-market road system, city streets, parking lots and airport runways. Historically, concrete pavements have exhibited a higher initial cost than asphalt pavements, but recent construction and market forces have narrowed that gap.

Moreover, the longer service life and lower maintenance costs associated with concrete make it a very attractive, sustainable paving material. Regardless of the type of equipment used, the success of your project depends on the skill set of your entire crew.

Driven by cost, need and limited resources, the technology for concrete removal and reuse is rapidly advancing. Partial removal of critical structural components for repair, rather than replacement, geographical constraints, access to structures planned for removal, environmental regulations and worker and structure safety will continue to affect the life span of developing methods and equipment.



With safety as a foremost consideration, thorough planning is essential when engaged in a removal project. The scope and type of concrete to be removed should always be evaluated and examined in detail to determine the most advantageous system(s).

Concrete parking lots have many similarities to other types of concrete pavement. However, parking lots differ from other pavements in that most of the area is intended for storage of vehicles and other goods, rather than for continuous movement of vehicles.

Load-bearing capacity, drainage, crack control, life-cycle cost, constructability and maintainability are other characteristics that are important in the design and construction of concrete pavements, including parking lots.

ADDITIONAL RESOURCES

Training Topic	ACI Resource
Construction of concrete pavements	ACI 325.9R-15
Roller-compacted concrete pavements	ACI 327R-14
Design & construction of concrete parking lots	ACI 330R-08

It's important to provide your team with the right guidelines for on-site investigation, thickness determination, durability considerations, paving operations and quality-assurance procedures during construction.

The sustainable construction benefits of concrete are considerable, especially when compared with other pavement materials. Concrete parking lots typically have service lives of 30 years or more, requiring no additional use of aggregates and other nonrenewable material resources throughout the period.

In addition to opportunities for the use of sustainable concrete component materials, such as recycled aggregates and other supplementary cementitious materials derived from industrial byproducts, concrete's light-colored surface helps reduce reflected solar radiation, and its higher reflectivity can reduce illumination requirements. Lower resulting energy requirements are realized throughout the facility's life cycle. Pervious concrete may be useful in reducing storm water runoff from the site.

To find training resources for your company, look to organizations that focus on your area of the industry. For example, The American Concrete Institute (ACI) offers numerous certifications, training programs, workbooks, free, online learning presentations and technical resources specifically designed for concrete construction employees. The organization offers online access to a wide range of concrete topics options, including webinars, online and on-demand classes, certificate programs and free, online education presentations, providing guidance and best practices to concrete contractors and their employees.

These resources provide industry professionals with indispensable information. Topics include concrete fundamentals, slabs-on-ground and decorative concrete flatwork. ACI also offers 21 certification programs designed to form a minimum qualification for personnel employed within the concrete construction industry. **CBO**

Michael L. Tholen, PhD, PE, is managing director, engineering & professional development, at the American Concrete Institute (ACI). Prior to joining ACI in 2005, he spent over 8 years as a structural engineer in the Aviation and Architecture Division at Burns & McDonnell Engineering Company in Kansas City, Missouri. Visit concrete.org.

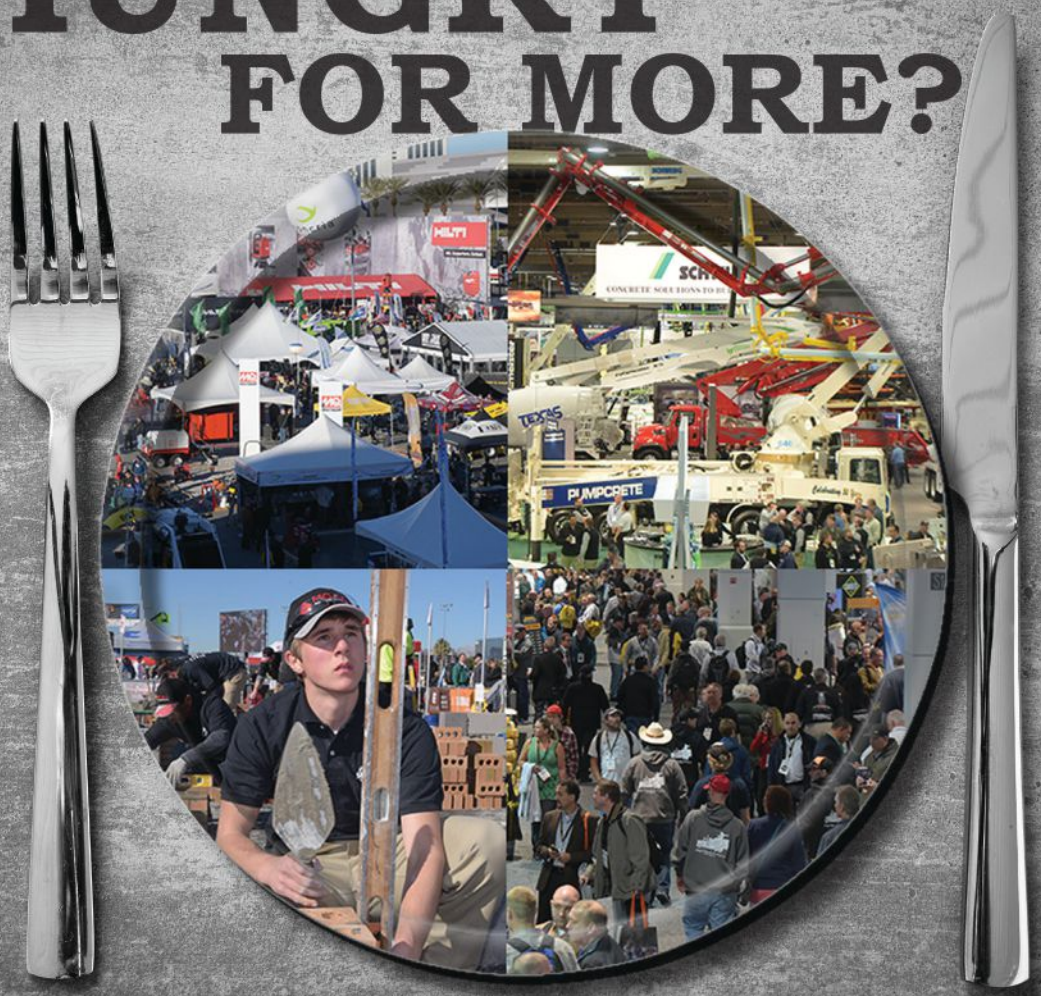


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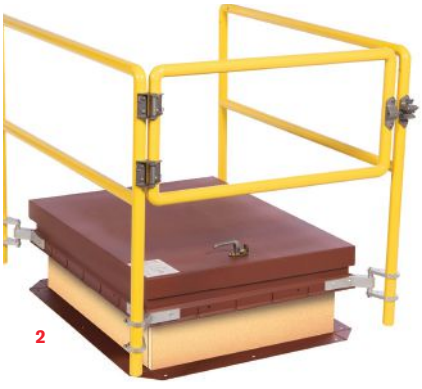
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1 SUPER-DUTY INDUSTRIAL TRAILERS

Hamilton announced Hercules, a line of pre-engineered, super-duty industrial trailers. The line has a load capacity range of 20,000 to 40,000 pounds per trailer and is pre-engineered for quick turnaround. The line is fifth-wheel-steer type with a total of 10 standard deck sizes, starting at 4 feet wide by 8 feet long and ranging up to 5 feet wide by 24 feet long. Each Hercules deck is constructed of quarter-inch plate steel with structural steel channel, ranging from 5-inch on the 20,000-load trailer to 12-inch on the 40,000 version.

cartsandtrailers.com

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2

2 ROOF HATCH SAFETY RAILING SYSTEM

The BILCO Company announced the BIL-Guard 2.0, the second generation of its roof hatch safety railing system, is now available for order. The BIL-Guard 2.0 boasts aluminum construction for increased strength and rigidity, a redesigned self-closing hinge and positive latching system and stainless steel hardware. The product is available with a safety yellow powder-coat finish over the corrosion-resistant aluminum rails. Also compliant with OSHA fall protection standards (29 CFR 1910.23), the BIL-Guard 2.0 features an innovative mounting system that does not penetrate the roofing membrane. The new system is easier to install than prior models, and does not require special training or certification for proper installation. The design features quick-mount curb brackets for a fast, secure attachment and pivoting mounting sleeves with compression fittings to lock the railing system into place.

bilco.com

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5

3 FABRIC HOUSE BUILDING

ClearSpan Fabric Structure's new fabric house building is an updated design of a ClearSpan classic. The structure utilizes the frame from the hybrid building, but covers it completely in fabric. The fabric house building features a peaked roof and overhanging eaves that provide extra outdoor coverage. The sidewalls are available in heights of 13 feet or 20 feet, ensuring plenty of clearance for any application. The building is constructed using a dependable, American-made steel frame. The frames have been triple galvanized, so they can resist corrosive environments. The frame is covered with 12.5-ounce, 24-mil polyethylene. The fabric polyethylene features a rip-stop weave that prevents any tearing or damage. The fabric allows natural light to filter through, eliminating the need for artificial daytime lighting.

clearspan.com

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4 LONG-REACH CRAWLER EXCAVATORS

CASE Construction Equipment's CX210D LR and CX250D LR crawler excavators provide increased operating performance for deep trenching, sloping, demolition, dredging, digging in sand or gravel pits or any application that requires long-distance bucket reach and precision. Each Long Reach (LR) model features an elongated boom and arm for increased digging capabilities in deep or long-distance digging applications. Each model also offers more standard features than previous CASE excavators. The CX210D LR and CX250D LR both employ an SCR Tier 4 Final solution that provides greater fuel efficiency (CX210D LR—up to 9 percent, CX250D LR—up to 14 percent) without sacrificing power. SCR lets the engine run at peak performance throughout the work cycle and, because it works without a diesel particulate filter (DPF), there is no DPF regeneration or associated lifetime service costs.

casece.com

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5 CLIMBING, RETRACTABLE TETHER

Gear Keeper's new RT3-5605 heavy-tool, retractable tether's ultra-low profile keeps tools close to the body when stored, while still allowing complete accessibility when in use. The RT3-5605 is engineered so that the tool, application and recoil/retraction force are in balance. Designed to avoid worker fatigue in order to maintain productivity, only minimal force is necessary to extend the RT3-5605 tether for use. The RT3-5605 heavy-tool tether has a generous reach that extends more than 55 inches. The strong, impact absorbing nylon webbing (for tools up to 3.5 pounds) does not require an additional shock absorbing lanyard end. Tools are attached via a stainless steel, thumb-controlled, locking-gate carabiner. The RT3-5605 also reduces arm strain when working with heavier tools. The tether features a thumb-controlled gear lock to secure the tool at any extension length.

gearkeeper.com

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6 REMOTE-CONTROLLED DEMOLITION MACHINE

Brokk introduced the new Brokk 280. The machine features increased demolition power over its predecessor, includes the all-new Brokk SmartPower electrical system and incorporates additional hardened parts for extra durability in tough environments. The Brokk 280 features a 20-foot reach and weighs 6,945 pounds. By generating as much as 25 percent more breaking performance over its predecessor, the Brokk 280 delivers a significant boost in productivity. Brokk also introduces an all-new electrical system, Brokk SmartPower, on the Brokk 280. The intelligent system includes hardened components and fewer moving parts. The system also optimizes machine performance based on a number of factors, including power supply quality and ambient temperature. Brokk SmartPower senses when a power supply is poor or faulty, making it suitable for generators or unreliable power supplies. The Brokk 280 boasts a 60-percent increase in cooling system capacity over the Brokk 260 it replaces.

brokk.com

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6

7 MINI HYDRAULIC EXCAVATOR

The **Cat** 304.5E2 XTC mini hydraulic excavator is the first model in the Xtra Tool Carrier (XTC) lineup. The 304.5E2 XTC has an innovative skid steer coupler interface for added versatility and work-tool integration. This manual coupler allows for use of compact loader tools. Coupler operation is controlled through a flick of the XTC switch on the right-hand console in the operator station, then the standard, right-hand joystick then becomes your loader. The 304.5E2 XTC allows operators to achieve improved productivity in material carrying applications, and also allows for reduced backfilling times. Due to the addition of the compact loader coupler interface, multiple applications may be achieved at a single jobsite with a single machine. This offering also improves efficiency of machine transport. The 304.5E2 XTC also includes the standard features and benefits of the E2 model lineup. All operator stations are ROPS certified, and the Cat interlock system, which prevents hydraulic movement when the safety bar is raised, adds further to operational safety, as do the automatic swing brake, retractable seatbelt and travel alarm.

cat.com

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7

8 COMPOSITE SERVICE BODIES

Lightweight, high-strength **BrandFX EverLast** composite service bodies are available for 40-, 56-, 60-, 84-inch Cable-To-Axle (CA) trucks. BrandFX EverLast composite service bodies offer a number of advantages compared to conventional metal bodies, including a unique combination of high strength and light weight. An EverLast service body can weigh as little as 50 percent of a similar steel body, which can equate to thousands of dollars in fuel costs savings annually. Additionally, the lighter weight of EverLast bodies reduces wear on tires, brakes, and suspension components. This reduced weight can also allow for additional load capacity for a truck equipped with an EverLast service body.

brandfxbody.com

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8



9

9 F-SERIES MEDIUM-DUTY TRUCK

Isuzu Commercial Truck of America Inc. announced key specifications of its all-new entry in the Class 6 medium-duty truck segment, the 2018 Isuzu FTR. Product highlights include 25,950 pounds GVWR; eight wheelbase length options, ranging from 152 to 248 inches; a turbocharged, Isuzu 5.2-liter, 215-hp 4HK1-TC engine; and an Allison six-speed automatic transmission with power takeoff (PTO) capability. The FTR is slated to go into production at a new facility in Charlotte, Michigan, in mid-2017.

isuzucv.com

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10

10 TILT-TURN WINDOW

St. Cloud Window Inc. announced the SCW 3530 Tilt-Turn window. The SCW3530 Tilt-Turn window provides the option for two open positions, with one handle controlling all operations. With a simple 90-degree turn of the handle, the tilt-turn hardware allows the window to tilt inward at the head, for secure ventilation and worry-free protection from the elements. Alternatively, turning the handle 180 degrees allows the vent to swing inward like a casement window for easy cleaning or a full breeze. Turning the handle to the downward vertical position securely locks the vent with a full compression seal.

stcloudwindow.com

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11 LF14000NN LUBE FILTER

Cummins Filtration announced it has further refined its Fleetguard LF14000NN combination lube filter for the arrival of newer engine platforms, including Cummins X15 engines. The new Fleetguard LF14000NN uses a cobonding lamination process that pairs NanoNet and StrataPore media together to create a single filter element. The new Fleetguard LF14000NN further reduces flow restriction, allowing the latest generation of diesel engines to operate more efficiently with less parasitic power loss, which can lead to better fuel economy and lower CO_2 emissions. Depending on the quality of the oil used, the LF14000NN is capable of longer service intervals, which help fleets lower operating costs on replacement filters over the course of an engine's life.

cumminsfiltration.com
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11

12 18V MITER SAW WITH CORDED CAPACITY

Milwaukee Tool announced the M18 Fuel 10-inch Dual Bevel Sliding Compound Miter Saw. By harnessing the performance of M18 Fuel, combined with the power and runtime of the new M18 RedLithium High-Demand 9.0 Battery Pack, Milwaukee is able to introduce the 18V miter saw to deliver corded capacity and performance, with the convenience of cordless portability. The miter saw has the capacity to complete a wide range of core applications, from frame to finish, including 5-3/4-inch vertical capacity for cutting large base up against the fence, 2x12 horizontal capacity for cutting stair treads and large stock, and 5-1/4-inch crown nested for cutting large crown molding in position. With an easy-to-access bevel handle located on top of the saw, users can reach a bevel capacity of 48 degrees left and right and utilize 9 bevel detent stops. An adjustable, stainless steel detent plate includes 11 detent stops and allows a miter range of 50 degrees left and 60 degrees right.

milwaukeetool.com
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12



13

13 ROUGH-TERRAIN CRANE SERIES

Liebherr has supplemented its product portfolio with a series of rough-terrain cranes. Both new crane models feature an outrigger monitoring system as standard. The support status is detected automatically and saved to the crane controller. The attachment of the ballast to the turntable and the installation of the optional double folding jib, including its angle adjustment, are also recorded and monitored. Both crane models are powered by a Cummins diesel engine, which meets all current emissions regulations. The engine develops 264 horsepower and supplies a maximum torque of 730 pounds per foot. A six-speed powershift transmission from DANA and large 29.5 R25 tires guarantee the required off-road capability for the crane, with a maximum speed of 15 mph. All-wheel and crab steering ensure easy handling and high maneuverability in constricted conditions.

liebherr.com
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14



15

14 WA270-8 WHEEL LOADER

Komatsu America Corp. has introduced the new WA270-8 wheel loader. Equipped with an EPA Tier 4 Final certified engine, this addition to the wheel-loader family combines high production with low fuel consumption and improved operator comfort. The WA270-8's parallel-lift linkage, with auto tilt-in to simulate a Z-bar, can be used in virtually any application. Fuel consumption is lower by up to 3 percent in V-cycle loading and 2 percent in load-and-carry applications. Standard features of the new WA270-8 include a powerful 6.69-liter, 149-hp, EPA Tier 4 Final certified, SAA6D107E-3 engine uses up to 3 percent less fuel than its Tier 4 Interim predecessor; Komatsu Diesel Particulate Filter (KDPF) and other after treatment components are designed in conjunction with the engine for efficiency and long life.

komatsuamerica.com
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15 ROTARY HAMMER

The **Bosch** GBH2-26 1" SDS-plus Bulldog Xtreme Rotary Hammer weighs only 6.4 pounds, but features an upgraded 8.0-amp motor that provides outstanding performance—delivering 2 foot per pounds of impact energy and 0-4,000 impacts per minute. The GBH2-26 offers 1-inch diameter capacity and three modes for maximum versatility: drilling only, hammer drilling and chiseling. The user can optimize the chiseling angle with Vario-Lock positioning. A pistol-style, ergonomic handle with a soft-grip provides superior user comfort. The hammer has a rotating brush plate that provides equal power in reverse and ensures long brush life. A variable-speed reversing trigger (integral clutch) offers accurate bit starting and removal of bound fasteners or bits, so users can get the job done more quickly. The SDS-plus bit system allows for tool-free bit changes with automatic bit locking.

boschtools.com
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18

16 COMPACT TRACK LOADER

ASV LLC introduces the large-frame, radial-lift Posi-Track RT-75 compact track loader. The RT-75 features efficient hydraulics and an high-capacity cooling system while delivering superior serviceability. ASV's Posi-Track undercarriage provides the industry's highest ground clearance, lowest ground pressure, best traction and longest track life. The RT-75 is a new compact track loader ASV builds from the ground up, starting with the undercarriage. The machine features ASV's patented Posi-Track rubber track suspension. The dual-level suspension of the RT-75 features both suspended wheels and axles, allowing it to manage every type of terrain and at faster speeds. The suspended wheels and fully-flexible track conform to the ground, assuring maximum traction in the roughest conditions. In addition, the multiple wheel contact points and triple-guide lugs achieve maximum performance on steep slopes.
asvllc.com
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17 LARGE-FRAME SKID STEER LOADERS

Contractors can now expect even more power, productivity and uptime on the job with the new **John Deere** large-frame G-Series skid steers (330G, 332G) and compact track loaders (331G, 333G). The biggest improvement on the large-frame G-Series is the refined vertical-lift loader boom design. Height to hinge pin is 11 feet. Customers will also appreciate the new lift path that extends an additional 6 inches from the machine. The large frames also serve up substantially greater boom and bucket breakout forces. They have horsepower that is comparable to a small backhoe or crawler, and they also work comfortably in tight quarters, so operators can accomplish more with less machine.
johndeere.com
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18 WORM DRIVE SAW

Skilsaw announced a fully integrated worm drive saw designed to score and cut concrete. Until now, users had to create their own tool workarounds to score concrete by modifying a worm drive saw with third-party or homemade attachments. Skilsaw engineered this saw with an integrated wet/dry dust management system to control dust, allowing for cleaner cuts and GFCI protection. Medusaw features a Cut-Ready adjustable plunge lock that allows users to quickly and accurately set and make consistent plunge cuts. The saw also has an integrated, rolling foot plate with rubber wheels that help users move it smoothly across hard surfaces and rust-resistant brackets and fasteners to protect against corrosion.
skilsaw.com
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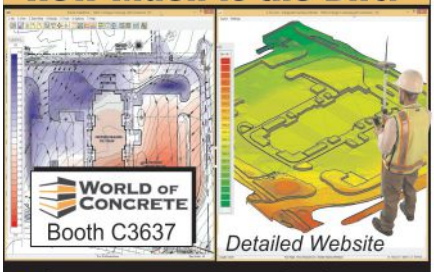
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Annual Value of Construction Put in Place

2014/2015/October 2016 Annual Rate Comparison

This chart compares the two previous years' total value of construction put in place to an annual forecast based on October 2016 figures. (Millions of dollars. Totals may not add up perfectly due to rounding.)

	2014	2015	Oct 16
Total Private Construction	**704,483**	**827,345**	**885,850**
Residential	349,643	433,108	466,238
Nonresidential	354,840	394,237	419,612
Total Public Construction	**280,019**	**296,153**	**286,788**
Residential	5,566	5,909	6,693
Nonresidential	274,453	290,244	280,096
TOTAL Construction	**984,502**	**1,123,497**	**1,172,638**

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

$1,172,638

OCTOBER 2016 TOTAL ANNUAL VALUE OF CONSTRUCTION PUT IN PLACE

"Hopefully we'll get a sense of what **direction** we will be headed once we get a clearer read on how the **new administration's policies** might impact the **overall economy** as well as the construction industry," said AIA Chief Economist Kermit Baker, Hon. AIA, Ph.D.

AIA Architectural Billings Index (ABI)

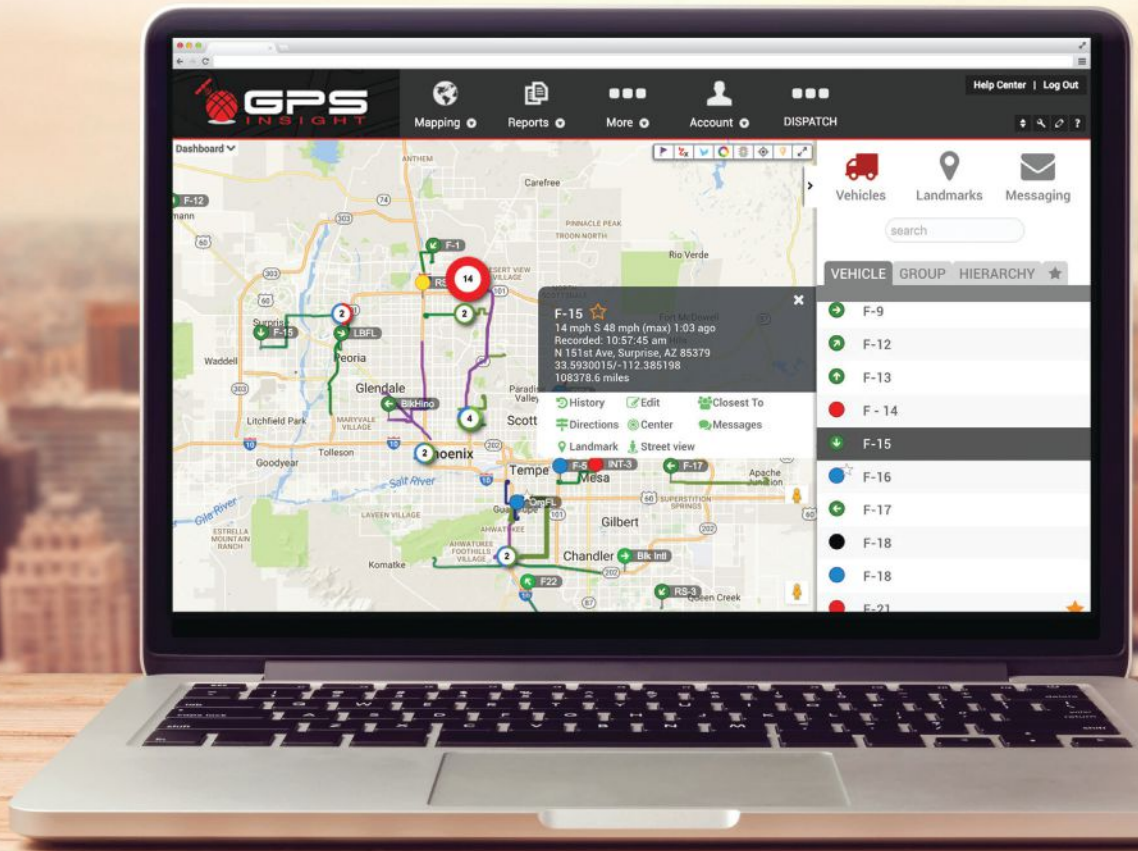
	National		*Regional - Billings				*Sectors - Billings			
Month	Billings	Inquiries	Northeast	Midwest	South	West	Multifamily Residential	Commercial/ Industrial	Institutional	Mixed
May-16	53.1	60.1	51.2	49.9	53.7	53.8	53.7	51.0	53.0	51.0
Jun-16	52.6	58.6	51.8	48.2	55.5	54.1	57.9	50.3	52.7	51.0
Jul-16	51.5	57.5	49.3	50.1	56.9	49.2	55.2	50.3	50.7	50.5
Aug-16	49.7	61.8	44.9	52.8	55.2	49.0	50.9	50.8	50.7	51.8
Sep-16	48.4	59.4	44.0	50.1	53.4	49.5	48.8	50.4	49.0	49.8
Oct-16	50.8	55.4	47.3	46.8	53.7	49.7	51.2	49.8	49.1	49.5

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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