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Waste Not

Tools to jumpstart improved quality and getting 'Lean'

by Dr. Hollis "Hank" Bray
PE, CPC, LCI, CM-Lean
Associate Professor, UALR
Department of Construction
Management & Civil and
Construction Engineering

WHAT IS LEAN CONSTRUCTION? LEAN CONSTRUCTION ADAPTS PRINCIPLES FROM MANUFACTURING-BASED PROCESSES TO THE PROJECT-BASED CONSTRUCTION WORLD. LEAN CONSTRUCTION USES QUALITY TOOLS AND PRINCIPLES TO OPTIMIZE THE CONSTRUCTION PROCESS THROUGH REDUCTION OF WASTE AND CONTINUOUS IMPROVEMENT.

Ok, But What Is Quality?

In the construction and engineering world, quality means "meeting the requirements of the customer." We achieve it by meeting performance standards such as customer specifications, or even our own internal quality standards. Quality is not wholesomeness or goodness. It is delivering the built product that our customer desires.

What's So Hard About Meeting Customer Expectations?

Nothing much. On most construction projects, we eventually meet the specs. But sometimes it takes more than one try. The problem is, we only get paid once, when we get it right. That's one of the definitions of waste – rework. Rework is a significant cost in construction that adds no value to the work for either the

constructor or the owner. Depending on how you estimate it, direct rework costs can easily exceed 5% of direct costs on a project. If this seems high to you, Google it. It's been confirmed in numerous studies, and not really in dispute. So, reducing rework is lucrative, because every dollar saved goes directly to the bottom line.

What About Other Kinds of Waste?

And I don't mean scrap materials – although that is important, too. There are at least seven forms of waste in construction, including some you might have thought about:

- Defects - requiring rework.
- Unnecessary transportation – moving materials around several times on a jobsite.
- Unnecessary motion – looking for

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Waste Not

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lost tools and supplies.

These are pretty obvious, but here are some you might not have thought about:

- Waiting – Workers waiting for work to do, or work waiting for workers to execute it.
- Non-value added processing – finishing a floor to a higher level than the customer needed. That's obvious, you say. What about a piece of paper that needs four signatures when one would really do? Does that sound like the approval process?
- Inventory – Wait, what's wrong with inventory? That's waste? Yes, it creates parts and pieces that must be stored because they are not needed yet.
- Over production – Making more than is immediately required creates inventory. Inventory can serve as a buffer to keep the construction process flowing. But excess inventory takes up working capital and space. And inventory is not just materials. It can include work sequencing. Think about excavating footings far in advance of the foundation placement – that's over production, which creates inventory, and it leads to other waste like rework.

There's an eighth form of waste that is somewhat difficult to quantify:

- Under-Utilized Employees – sometimes we fail to get input from the people most familiar with the work – the ones actually performing it. In Lean Construction these people are called the “Last Planners.”

Eliminating these types of waste reduces costs and send dollars directly to the bottom line. Five percent is probably underestimating the potential savings from waste. I tend to believe it's more like 15-20% when you include lost opportunities.

But You Can't Really Get Rid of All Waste — Can you?

You surely cannot if you don't try. Lean Construction has incorporated some tools and techniques to help. On the construction side, Lean focuses on maximizing value-adding activities by increasing “throughput.” Throughput is a measure of completed, value-adding work that moves through the system - we get paid for it. The best case scenario for maxing out throughput is an assembly line. While construction cannot achieve assembly line throughput, you would be surprised what can be accomplished by planning. When you think about an as-

One kind of waste
you might not have
thought about:

Waiting
*Workers waiting
for work to do,
or work waiting
for workers to
execute it.*

sembly line, chances are you are thinking about repetition. Or if you are old enough, you may remember Lucy and Ethel on the chocolate assembly line - not the kind of throughput for which we are looking! But repetitive processes are not how we increase production – repetition is no good unless it's accompanied by one important factor – reduced variation – otherwise known as reliability. What we have learned is that maintaining a steady work flow increases throughput. But in construction, we often tend to maximize the speed of pieces of the process. Think about a subcontractor that is allowed

to get far ahead of the other trades that should be in coordination. Reducing variation optimizes the whole process – and that increases work flow that we get paid to perform. Think matching crew sizes of trades and material supplies to hand off work just in time for the next trade. Less workers waiting for work and less work waiting for workers to perform it. So predictable work flow is a key Lean Construction principle – not like Lucy and Ethel!

What Are the Barriers to Quality?

It's my opinion that the biggest barrier to implementing quality systems like Lean Construction is the corporate culture. Workplace culture is the character and personality of the organization. What behaviors and achievements are rewarded and encouraged? Quality culture requires a different way of thinking and approaching work that requires collaboration and innovation. It's not business as usual. In the United States there are many construction companies that have a proud history and heritage of hard work. It can be insulting and counter-productive to suggest to people that have worked hard to build a company that they need to adopt new ways, especially when the suggestions come from an outsider. Here is one example. The XYZ Company has always managed to bring in the job on schedule – when deadlines approach loyal employees work extra hours to make up for delays and bring the job in on time. There's a sense of pride in an organization that has provided a good living for many families over the years and been a great partner in the community. But there's a euphoric “high” associated with successfully turning around a job that's gone sour – and it's become a habit. Quality programs are seen as unnecessary, and even insulting. It's not that these hard working folks are bad people, no not at all. But work cultured are not changed overnight. Real change has to be led by the respected leaders in the organization – and they have to walk the walk as well as talk the talk. The good news is that the tools of Lean Construction are basically free to those that want to use them. It's like exercise. The problem is not the cost – it's the will to change.

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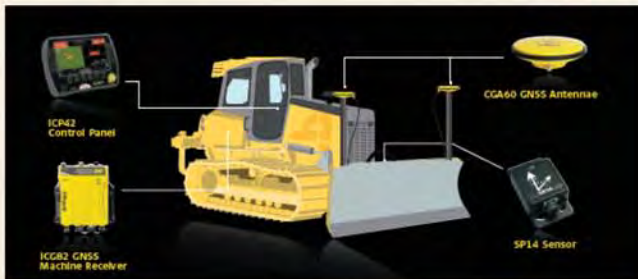


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Waste Not

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How Is Lean Different?

Lean has adapted well to construction because the tools work well with the one-off type of work so common in construction. It's not an actual assembly line, but an overall approach to reducing the common forms of waste and variation. And the tools work. Let's go back to that waste called non-value added processing. One example of this is a sloppy submittal and approval process. But here's one you might not think about - construction schedules with inappropriate levels of detail at the proper stage. We have come to a place with technology where we can construct schedules for twenty-four month projects down to the day. No one seriously believes that a daily schedule will be accurate on a project of that size, but what does it hurt? A lot, it turns out. By failing to scope the schedule to the appropriate level of detail, the construction planner fails to pay attention to the right details at the right time. The Last Planner® System was developed by Lean Construction pioneers Glenn Ballard and Greg Howell. Its use is licensed by the Lean Construction Institute – leanconstruction.org. It details a production planning system for predictable work flow and includes:

- Master/milestone schedule – proves a project can be accomplished to bring a desired value to the customer.
- Phase/pull schedules – breaks the project into sequences that can be planned by specialists that have authority to commit resources. More about Pull later.
- Look ahead schedules – this is where production control is instituted – including steady work flow, reliability and reduced variation – to increase throughput. This is generally a four to six week window also known as “make ready” planning. Includes representatives from suppliers and trades participating in the upcoming work.
- Weekly work planning – a detailed plan just before the work is done. Typically conducted by the “Last Planners” of work on a project - foremen and the jobsite superintendent - it can be expected to have 80 – 100 percent reliability. Lean systems like these are adapt-

able to the many different types of construction projects. Another key feature is continuous improvement. The Last Planner® System includes a scoring system that uses feedback to improve planning and reliability.

What Are Other Components of Lean Construction?

One other unique feature is the concept of “Pull”. In the traditional approach we “Push” work to the next trade or worker downstream, whether they are ready for work or not. When they are not, we are creating an “inventory” of work that adds no value to the job – we don't get paid for it. Better to send work just when it's needed. This is the classic problem of “workers waiting for work” or “work waiting for workers”. In a Pull system, work is released to the next worker or trade when it's ready to be received, in order to approach a steady, reliable work flow – which we know increases throughput – for which we get paid!

In addition, “Pull” or Phase planning, is somewhat like the “Backwards Pass” of conventional CPM scheduling. Starting at a milestone and working backwards, the question is asked, “What activity must be completed just before this?” After that activity is placed just before the milestone, the question is repeated – “What activity must be completed just before the latter?” – And so on. You can easily visualize the process as building a sequence of activities from the top of an eight story building down to the foundation. Pull planning identifies the sequence of handoffs necessary to control the production and create a steady work flow.

That's just the construction side of the equation. The benefits of Lean Construction are extended by Integrated Project Design (IPD) because Lean principles work in the design process as well.

What Can I Do To Get Started On My Lean Journey?

I always tell everyone that if you want to be successful in Lean you must make a commitment to learning. Seminars and speakers help. But just to be clear, this is probably not for everyone. If you are serious there are a couple of books you'll read.

My favorite book to introduce quality concepts is “Quality Is Free: The Art of Making Quality Certain”, Philip Crosby <http://www.amazon.com/>

Quality-Is-Free-Making-Certain/dp/0451625854 . This book is written in a narrative style that helps you imagine changing the culture of an organization while respecting the people in it.

“The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer”, Jeffrey Liker <http://www.amazon.com/The-Toyota-Way-Management-Manufacturer/dp/0071392319> describes the experiences of Taiichi Ohno in developing the Toyota Production System which became Lean manufacturing in the U.S. You might find it insightful.

The AGC of America has developed a 35 hour face-to-face education program for Lean Construction that includes the topics:

- Variation in Production Systems
- Pull in Production
- Lean Workstructuring
- The Last Planner® System
- Lean Supply Chain and Assembly
- Lean Design and Pre-construction
- Problem-solving Principles and Tools

After completing the course, you can sit for an examination to receive the AGC CM-Lean designation. See more at <https://www.agc.org/learn/education-training/lean-construction-education-program#sthash.YpTfToFZ.dpuf>

One last thing I would like to opine upon is that you cannot “sub out” your quality program. If you want to lead change in your organization you will become an expert in Lean Construction specifically and quality in general. That means an investment of your time and intellect. Remember, I said quality programs like Lean Construction were like exercise? Try subbing out your pushups and see how that works for you. ■

Hank Bray is an Associate Professor in the Department of Construction Management and Civil and Construction Engineering at the University of Arkansas at Little Rock. He is a Professional Engineer, a Certified Professional Constructor and a member of the Lean Construction Institute. Hank is a certified CM- Lean instructor and teaches the course for AGC Arkansas. He has 30+ years' experience in construction management and civil engineering.





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Igniting



Be Pro. Be Proud. a Movement

11

*by Randy Zook
President/CEO
Arkansas State Chamber
of Commerce/
Associated Industries of Arkansas*

ACCORDING TO A RECENT INDUSTRY REPORT BY THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, THE 2016 OUTLOOK FOR THE CONSTRUCTION INDUSTRY INDICATES POSITIVE GROWTH BUT HIGHLIGHTS SEVERAL CHALLENGES THAT MOST COMPANIES ARE FACING RIGHT NOW – THE LARGEST BEING WORKFORCE SHORTAGES AND RETIREMENT OF WORKERS.

The report noted that 71% of construction firms will increase their headcount this year. However, one factor that is hindering this growth is the availability of qualified workers. 70% reported having a difficult time finding skilled workers, including salaried and craft professionals. This is even after many of the companies have increased pay, incentives and/or benefits to help retain and recruit qualified employees.

In addition, the U.S. Census Bureau's 2013 Current Population Survey stated that nearly 40% of the construction workforce is 45 years or older. That means there are 3.7 million construction workers that will be retiring within the next 10 years.

While this is an epidemic on a national level, Arkansas has not been immune to these same challenges. The breadth and depth of dysfunction within Arkansas' workforce system is real and must be addressed. This crisis has two primary components:

- 1) Arkansas's education system does not adequately educate students who graduate from secondary or post-secondary schools about the opportunities for meaningful and financially-rewarding employment in technical skilled occupations, including construction.
- 2) In many, but not all respects, secondary and post-secondary schools are not adequately pro-

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Igniting a Movement

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viding fundamental skills graduating students must have to obtain and maintain technical skill-based employment.

These two factors have a significant impact on the state's economy. Already, Arkansas lags 18% behind the national average of per capita income growth. According to a survey conducted by the Arkansas State Chamber of Commerce, more than 60.9% of businesses in Arkansas have difficulty filling open positions due to lack of qualified candidates. In fact, shortage of qualified workers was cited as a top 5 issue/challenge by 81% of businesses surveyed. In addition to the difficulty in finding quality workers, 23.8% of businesses reported that between a third and a half of their current employees are approaching retirement age.

Over the past two years, the Arkansas State Chamber of Commerce and the Associated Industries of Arkansas Foundation have worked to develop an initiative designed to improve the image of technical skill-related education opportunities, technical trades and techni-

cal skill-based occupations across a wide range of business sectors, such as construction and manufacturing. In preparation for the development of this campaign, it was important to hear directly from business leaders, parents and students across the state in order to create a baseline of the overall sentiment of these jobs.

A survey was distributed by the Arkansas State Chamber of Commerce to business leaders across the state in a variety of industries including manufacturing, construction, transportation and many others. The results were staggering. 84% of those who responded are looking for an educational attainment of a two-year degree or less. 44% of average, entry-level salaries for current open positions are between \$31,000 and \$50,000. Employers also stated that they are aware of training programs, but too many are not partnering with them for recruiting purposes.

Next, six focus groups with students and parents were conducted throughout Arkansas to gain insight on the knowledge and perceptions of skilled professionals. Parents stated that they felt pressured by society to push four-year

degree paths and also strived to ensure their children had more opportunities for success than they might have had growing up. Both parents and students referred to trade jobs as something you learn to "fall back on." For students, because of the steering by their parents to attend college, not going to a four-year university was never an option because that is what they were expected to do.

After the survey and focus group results were analyzed, it was clear that students and parents don't see trade jobs as a first choice career option and business leaders don't see value in partnering with training institutions. The research conducted led to several solutions that needed to be addressed.

First, it was important to show Arkansas students what was involved in skilled trade jobs in their true environments and showcase how advanced technology has become in the construction industry.

Second, there was a need to demonstrate the higher-than-expected monetary value in specific skilled trade jobs. The misperception is that these jobs are low waged and that is not true. There are thousands of positions available in



Students can test their skills at interactive stations in the new Be Pro Be Proud Mobile Unit in areas such as plumbing, welding and trucking.

Arkansas that pay well above the state's income average.

Third, creating an attitude and messaging for the campaign that appealed to all target audiences - parents, students, educators, career coaches and school counselors, company leaders and two-year colleges - was critical to dispelling the myths surrounding skilled professional jobs. In order to close the skills gap, there must be a rallying cry that everyone can understand, support and ultimately, create action.

Finally, research showcased the need to provide real interaction with these types of jobs for students. In today's digital age, this generation is used to seeing videos or pictures instantly. Gaming is extremely popular with this group and it was clear that in order to change perceptions, a mechanism to offer students to touch, try, learn and interact was important to create.

Appropriately named "Be Pro Be Proud", this campaign shows the target audiences how they can find a new and profitable path to success. One of the key components was the creation of a mobile unit, which provides hands-on experience with skilled professions and

shows the jobs in depth to a live audience. The mobile experience contains profession video trailers, three different simulators - trucking, welding and CNC - and three interactive components, including a game, training center and job center. The mobile unit will be on a state-wide tour beginning this summer visiting companies and community events and eventually schools starting this fall.

Another important component is the website that contains information about the initiative, training opportunities, job openings and a variety of news and events. In addition, the website will feature different types of skilled jobs, the education/training needed, average annual and hourly wages, projected demand growth and job responsibilities.

The campaign will work with career coaches and school counselors to develop mentor match programs to pair students with current trade professionals, establish Future Pros of Arkansas clubs and develop Manufacturing Day Events throughout the state.

This multi-year initiative requires the support and cooperation of many across our state. This help is imperative to effect tangible change in the number of

students, teachers, parents, elected officials and other student-influencers who recognize skilled trades and occupations for the financial and career opportunities that they are.

To learn more how you or your organization can help in the success of "Be Pro Be Proud," please contact Beth Franks at (501) 730-5048 or email at bfranks@agcar.net. You can also visit BeProBeProud.org to find out more information. ■

Randy Zook is the President and Chief Executive Officer of the Arkansas State Chamber of Commerce and the Associated Industries of Arkansas.



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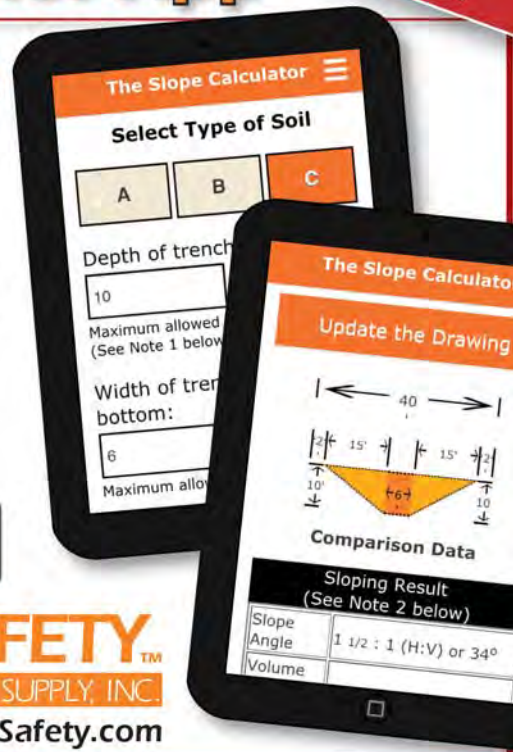
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*April 28 Arkansas Construction
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May 13 Spring Golf Tournament

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2016

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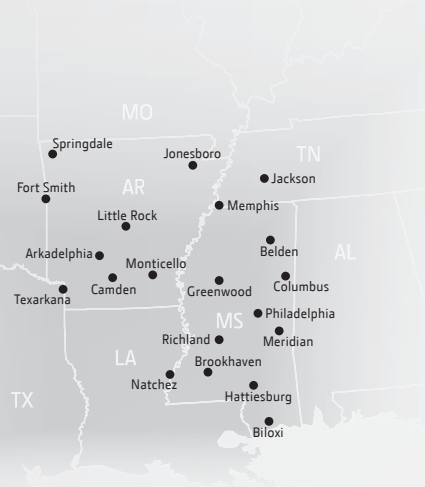
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Industry Pulse:

10 trends

To watch in 2016

by Emily Peiffer
Associate Editor,
Construction Dive

NOW THAT 2015 HAS COME AND GONE, CONSTRUCTION PROFESSIONALS ARE FOCUSING ATTENTION ON THE YEAR AHEAD. ANALYSTS PREDICT 2016 WILL BE A STRONG YEAR FOR THE INDUSTRY, AS DODGE DATA & ANALYTICS' 2016 CONSTRUCTION OUTLOOK REPORT PREDICTED 6% GROWTH, WITH THE VALUE OF CONSTRUCTION STARTS REACHING AN ESTIMATED \$712 BILLION.

We talked with experts from various sectors of the construction industry to find out their predictions for 2016. Their answers varied from new technology trends, to workforce concerns, to home-buyer preferences. But one common thread connected all of the experts: They have high hopes that 2016 will bring strong demand and booming business.

"I don't think I could be any more optimistic for 2016," Bud LaRosa, chief business performance officer and chief financial officer for Tocci Building Companies, told Construction Dive. "These are truly the good times."

Here are the top 10 trends to watch

in 2016, according to the experts:

1. Skilled labor shortage will continue to plague construction companies

The most commonly mentioned trend for 2016 was the continued effects of the skilled worker shortage. A significant portion of employees who left the industry during the recession never returned, and companies are still struggling to find workers at all levels to properly staff their teams.

"The overwhelming, number one issue is access to skilled labor," Dominic Thasarathar, Autodesk's senior industry program manager for construc-

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tion and natural resources, told Construction Dive. "So many people left the industry or were laid off, and now there's a real struggle to find the right people to staff the projects that are now coming online."

"Not only has the construction industry struggled to appeal to a younger, more technologically savvy workforce, but during the economic downturn, many companies opted not to bring in younger, newer talent," said Tom Menk, an assurance partner with BDO's national real estate and construction practice. "Now, that's causing struggles to fill that gap in the workforce, which is

The overwhelming, number one issue is access to skilled labor

coupled with the need across industries for companies to replace retiring baby boomers."

Another significant concern: The slowdown in immigration has contributed to the already existing labor shortage, as reports have found many workers who returned to Mexico during the recession have not come back to the U.S. due to increased immigration controls and more job opportunities in Mexico.

"I think politically, the environment against immigration has changed some of the workforce dynamics and made it difficult to staff a lot of the trades," LaRosa said. "I think that trend continues. I don't see that easing anytime in the next two to three years."

2. Prefab/offsite construction methods will become more popular

Offsite — also known as modular or prefabricated — construction has been gaining ground as an alternative building method that offers the benefits of reduced construction time, less waste and possible cost savings. As companies struggle to staff job sites and stick to difficult schedules, many have started to turn to prefab as an option that offers more certainty.

"A lot of use of things like prefabrication, we expect that to be an accelerating trend next year," Thasarathar said.

Ron Antevy, president and CEO of e-Builder, told Construction Dive he has seen a growing use of prefab methods, especially in the healthcare sector.

"(Prefab) is up-and-coming. That's a way to save costs and speed up the time," he said. "Some of the larger owners out there are starting to realize there are efficiencies there, but you have to be doing a certain amount of volume for these kinds of strategies to pay off."

Wider implementation of offsite construction has been somewhat hindered by the design and construction culture, according to experts at the Offsite Construction Expo in September. They also cited the change in the traditional building process that comes with off-site methods as a deterrent for implementing the approach, as contractors and owners struggle to adapt to the varied timeline of decisions and building. Still, the additional certainty that comes with prefab could catalyze the growing trend in 2016.

3. Construction companies will be more cautious about project selection

The crippling recession and lingering labor shortage have spurred another trend among construction industry decision makers: Many are now being more

cautious about the amount of new work they can handle, and about growing their companies.

"(Companies) are not going to overeat. They're only taking the work they can handle," Chris Kennedy, vice president of Suffolk Construction, told Construction Dive. "It's different from the last boom, when people were signing up for work. Everybody still has those recent wounds. They're going to be a lot more cautious about growing a firm bigger than they can handle."

The labor shortage has left employers at all levels forced to take a closer look at the number and size of projects they can handle at once.

"We as general contractors have become a lot more selective of the projects we pursue," Chuck Taylor, director of operations for Englewood Construction, told Construction Dive. "I think the subcontractors are going to be in a very similar position."

4. BIM will become a necessity, and owner interest in the technology will grow

Building Information Modeling has been a growing trend for years, as it is no longer relegated to just the largest firms. Experts have said BIM provides tangible business benefits, no matter the level of implementation. Many have cited BIM's ability to provide more consistent, more accurate and less time-consuming project document generation. In addition,

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BIM users can expect better collaboration and coordination among the different parties involved in a project, according to industry users.

"It used to be a nice thing to have, and now it's a necessity," LaRosa said.

Jay Dacey, president of Integrated Builders, added, "In the bigger jobs, BIM is pretty much a staple right now."

Antevy said he has seen owner interest in BIM grow, as many are now requiring their contractors to utilize

the technology.

"The owners have been hands-off as it relates to BIM. It has been for the contractors and designers, so we're seeing owners start to get more interested in that," he said. "They're interested because there's data there that they can capture and capitalize on."

5. Green building will grow in commercial and residential sectors

Commercial construction has typically led the pack in green adoption, but the residential sector is starting to catch up. The growing trend in both sectors

is driven not just by a desire to produce environmentally friendly structures, but by consumer demand, higher-quality results and lifecycle cost savings, according to experts at Greenbuild 2015.

Thasarathar said that with larger construction projects, companies are aiming for LEED certification, "even if it's not prescribed."

Dacey added that although developments outside of city centers tend to not prioritize LEED as much, "almost every building design incorporates green principles." He said he expects green building and LEED certification to continue growing in the coming years.

In the residential sector, green building currently accounts for 26-33% of the total residential market and has helped contribute to the industry's recovery after the recession, according to Dodge Data & Analytics.

"I do think (green building) is a growing trend in response to demand," Robert Dietz, an economist with the National Association of Home Builders, told Construction Dive. He pointed to the aging in place movement as a driving force for that demand, as baby boomers are remodeling their current homes and seeking out ways to increase energy efficiency and reduce utility bills.

6. Jobsite accidents and criminal indictments on the rise

Last year, authorities across the U.S. pumped up efforts to seek out contractor misconduct and dish out severe punishment, including criminal charges, for violations and offenses from worker safety issues to corruption. Manhattan even launched the Construction Fraud Task Force in August to investigate "wrongdoing and unsafe practices" in construction, including fraud, bribery, extortion, money laundering, bid rigging, larceny and safety violations. A New York Times report in November also found that construction worker deaths are on the rise in New York City, and safety measures were inadequate on many of the construction sites where deaths occurred and that immigrants represented a disproportionate percentage of those killed.

Experts predict this heightened focus on industry wrongdoing will continue into 2016, especially as OSHA will increase its fines this year for the first time since 1990.

Raymond T. Mellon, a senior partner at Zetlin & De Chiara, said he believes



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construction accidents will increase in New York City this year due to “a dilution of the trained and experienced work force as a result of the continuing red hot construction market.” He added, “This will lead to more entry level, unseasoned construction workers not appropriately trained as to the work itself, as well as safety features, on worksites. Combine this with the entry of ‘novice developers’ who have a tendency to cut corners, and you have the potential for more accidents.”

David Pfeffer, chair of the Construction Practice Group at Tarter Krinsky & Drogin, said he predicts there will be more criminal indictments in 2016 because officials “want to make an example.” He added that although indictments this year will be the result of past practices, he believes the influx of cases will “help in the long-term future. It definitely has an effect... We have a very good construction industry here. They do listen. The bad contractors generally don’t stick around.”

7. Booming multifamily sector will slow down as single-family sector picks up steam

Industry analysts have largely agreed that the multifamily sector’s hot streak will inevitably cool down, and that slowdown will likely occur in 2016. On the positive side, the single-family sector is expected to pick up steam and see a strong year. In its 2016 Construction Outlook, Dodge Data predicted single-family construction will see a 20% increase in starts this year, while multifamily is expected to post a 7% gain after several years of double-digit increases.

“I expect the homebuilding sector will continue to show improvement. If anything happens on the multifamily side, I think it will probably level off. The upward slope for multifamily won’t be as strong as for single-family,” Alex Carrick, CMD’s chief economist, told Construction Dive.

Still, single-family housing has a long way to go to return to pre-recession, “normal” levels. During a webinar in November, NAHB Chief Economist David Crowe said single-family construction is currently 53% back to what is considered “normal” levels, and should be 91% of the way there by the end of 2017. Multifamily, on the other hand, is already significantly higher than “normal” levels, currently 32% above the mark. Crowe

said the multifamily sector is expected to slowdown in the next two years, coming in 9% higher than “normal” levels at the end of 2017.

8. Laser scanning technology will gain popularity

Although BIM tends to dominate the construction technology narrative, experts pointed to another emerging technology that is having a significant impact on the industry: laser scanning. 3-D laser scanners can create a digital reproduction of the dimensions and positions of objects in a certain space, and

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we pursue*

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then turn that information into a point cloud image.

"Laser scanning I think has a lot of room to run.

Not as many people are using it, but it's a great tool to measure more precisely than most conventional ways," LaRosa said. "What the laser scanner allows you to do is get millions of data points and put that into a building information model and provide much more information about conditions you couldn't get previously. Look for that to continue to grow certainly next year and for another five years."

Taylor added that laser technology allows contractors to precisely "define to the client where we had issues with the existing floor," and then make the necessary changes.

9. Remodeling will have a strong year, especially in the luxury market

Along with strength in the single-family market this year, experts also predict the remodeling sector will have a banner year in 2016.

"We're encouraged by recent data that shows consumers have a strong desire to invest in their homes. In fact, survey respondents are indicating that growth in their home improvement spending is outpacing increases in their overall spending," Mike Horn, vice president of Lowe's ProServices, told Construction Dive. "The number of homeowners indicating that their home improvement spending increased has doubled since 2012. This trend underscores the great opportunity our

professional contractors have to meet the needs of 75 million homeowners, in addition to the 5 million who relocate or move into a new home each year, across the country increasingly willing to engage in home improvement in 2016."

Bob Ernst, president of the Building & Remodeling Association of Greater Boston, said he projects significant growth in the remodeling sector this year.

"Through all of the ups and downs, this is the first time I feel very comfortable," he told Construction Dive.

Ernst emphasized the luxury market in particular as offering the most opportunity for remodelers. "At that market level, they're spending money," he said. He noted, however, that the middle and lower markets haven't reached the demand level exhibited in luxury markets, as people in those markets are still struggling to save up enough money for their homes. "People serving primarily those markets might not have as rosy of an outlook," he said.

10. Homebuyers will seek out simple, walkable communities

Last month, the American Institute of Architects released the results of its third-quarter Home Design Trends Survey and found that design elements such as access to public transportation, multi-generational housing, walkable neighborhoods and mixed-use facilities dominate homeowner preferences. "There has been a pronounced shift in driving habits over the last few years, with increasing numbers of people being far more interested in walking and utilizing public transit options," AIA Chief Economist Kermit Baker said in a release. "With that is a desire for proximity to employment and commercial activities."

The AIA survey coincided with a National Association of Realtors survey over the summer that found walkable communities are growing in popularity among Americans of all ages, particularly millennials. Based on the results of the survey, the NAR advised developers aiming to reach the millennial demographic to consider building attached homes within walking distance of shops and restaurants and nearby public transportation. Baby boomers have reportedly expressed similar desires for their homes, as a Washington Post report in October found retiring baby boomers are downsizing and buying smaller homes in urban areas at twice the rate of millennials.

Jerry James, president of Edward R. James Homes, said he predicts baby boomers will continue to drive the new-home construction market this year. He agreed with the NAR and AIA predictions and said he believes boomers want "simplification" driven by a desire to live in locations that allow them to walk to nearby restaurants and shops. ■

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*Through all of the ups and downs,
this is the first time
I feel very comfortable.*

Safety: There's an app for that

by Joe Morgan
AGC Safety
& Training Manager



For the majority of us, smartphones have changed the way we go about our daily routines. It has essentially become our own personal command center. Apps can definitely provide convenience in our personal lives, but apps can also assist us in our professional endeavors. With the abundance of apps available, your smartphone can become a tool toward improving your own productivity in any job function. Safety is no different. There are many apps about protecting your employees and maintaining compliance as required by regulatory agencies. Here are a few apps that I have found useful and easy to use.



OSHA Heat Safety Tool – When you're working in the heat, safety comes first. With the OSHA Heat Safety Tool you have vital safety information available whenever and wherever you need it. The app allows you to calculate the heat index for the worksite, and, based on the heat index, display the risk level to outdoor workers.



First Aid by American Red Cross – Accidents happen. The official American Red Cross First Aid app puts expert advice for everyday emergencies in your hand. Get the app and be prepared for what life brings. With videos, interactive quizzes, and simple step-by-step advice it's never been easier to know first aid.



iAuditor – Safety and Quality inspections are fast and easy with iAuditor. Build your own forms in seconds, or browse through iAuditor's shared public library of over 56,000 inspection forms that users have shared and collaborated with to find ways of working smarter, and faster.



Wiser for iOS – Wiser is a mobile application designed to assist first responders in hazardous material incidents.



Roofing Safety is NO ACCIDENT – Falls are the number one cause of work-related deaths in construction and a leading cause of injuries. This app provides safety guidelines, safety tips, OSHA regulations, and even a tool that uses your smart phones camera to calculate pitch.



Ladder Safety – From the National Institute for Occupational Safety and Health (NIOSH) This app features a multimodal indicator, which uses visual and sound signals to assist the user in positioning an extension ladder at an optimal angle. It also provides a source for selecting the appropriate ladders for the job, ladder inspection and much more.



3M Active Safety – This app is basically your Personal Protective Equipment (PPE) manager. Inventory your PPE, document inspections, and out of service dates all in the palm of your hand. You can also create a check-in check-out system for certain PPE. In addition, all of this data can easily be converted to an Excel spreadsheet for your convenience.



SDS Mobile – Get instant access to the innovators of electronic SDS management's industry-leading database of MSDA and reformatted GHS-compliant safety data sheets (SDS).



Sound Meter+ – Sound Meter+ is a multi-function noise meter. This app includes a sound level meter, noise DOSI meter and impulsive noise meter with live professional grade hearing-safety monitor messages and alerts.



WeatherBug – What safety app toolbox would be complete without a weather app. There are many available and great apps out there. My preferred choice is WeatherBug, exclusively because of its “Mr. Sparky” which gives you the actual distance of the closest lightning strike to your location.

Again, I have personally used and subsequently found these apps useful. However, there are many others available, and I encourage you to research and find ones that help make your job-site and employees safe. When looking at different apps be sure and check the date the app was last updated. Some apps have been created and almost abandoned in a sense. We all know it is imperative to our jobs and towards compliance to have the most up-to-date information on hand. I hope you find this information as useful as it has been to me. Good luck and be safe.



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Take a look at these two great tech stories from our friends at Construction Executive. The first story will help you understand which tech option is right for you followed by a great read about how to get your team on board.

Are You Ready to Implement SaaS and Mobile Solutions?

by Fred Ode

Technology is moving fast, with more gadgets, devices and services around for work (and entertainment) than ever before. But just because new technologies exist doesn't mean that they are right for every contractor—or that every contractor is ready to use them. Many believe buying the latest and greatest technology will immediately solve all of their problems, which rarely happens. Contractors must approach potential solutions with an end goal and a solid plan for achieving the desired results.

Software as a Service (SaaS) and mobile solutions are two of the more

prominent technologies taking the spotlight in the construction industry. Both offer ways to increase efficiency and give contractors tools to run their businesses better, but a few things should be kept in mind when assessing options.

SaaS

SaaS is a pay-as-you-go subscription-based method for companies to securely use software from any location or device with Internet capability. The application is hosted and operated by a software vendor, which maintains responsibility for all hardware, software installation, updates and system backups.

One of the biggest benefits of SaaS is convenience. Contractors do not need to invest in expensive equipment to operate it and applications are accessed through the browser of any device with Internet access. Plus, SaaS vendors regularly back up data, update the software, and offer improved data encryption and security to ensure an excellent product.

Working with SaaS evens the playing field by allowing contractors of all sizes to use sophisticated solutions without the large upfront costs of purchasing software, hardware and other equipment.

The following questions can help contractors determine if SaaS is a good option for their business.

- Can most of the company's applications and software be moved to a hosted environment?

- Does the firm want to reduce IT and equipment costs?
- Does the firm have a reliable Internet backup and a reliable 4G network?
- Do employees who work remotely need to log into the software on a regular basis?

With improved IT infrastructure and application deployment in geographically dispersed locations, SaaS is something to consider as it becomes more prominent in the construction industry.

Mobile Solutions

Mobile solutions allow contractors to quickly add and access data directly from the field, reducing double entry and the risk of errors from manual entry. They give a more accurate picture of financials with real-time data updates from the field to the office (and vice versa) and offer more flexibility—allowing employees to be productive out of the office and after normal work hours. Mobile solutions help bridge communication between the field and the office to keep everyone on the same page.

A variety of applications are available to the construction industry via smartphones, tablets and other mobile devices.

Field timecard entry. Enter time by employee or job, run proofing reports and make changes from the field—potentially eliminating handwritten timecards.

Equipment usage. Monitor equipment usage information by employee or job.

Quantities complete. Record quantities completed by employee or job.

Project management. Enter field logs, including comments about the job, weather and delays; send pictures back to the office and sync data with accounting or job costing software; and track correspondence and project manager documentation from the field, including submittals, RFIs, RFPs and RFCs.

Materials usage. Track materials received and used at a jobsite, pull inventory items from stock and determine job costs in real time.

GPS. Record when employees arrive at or leave a jobsite, which can verify labor hours and cost accuracy.

Service dispatch. Track labor on service calls, the location of a field technician, materials used, and arrival and departure times; obtain signatures from



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the field; push billings and work orders back to the office; and give real-time updates on employees in the field for dispatch to schedule new calls.

A few things must be considered before jumping on the mobile bandwagon. First, determine policies on cost and proper use of the mobile devices (personal versus business). Second, make sure people are willing to learn and use the mobile devices, and that a process is in place to harness all the data collected from mobile devices. For example, a contractor that wants to implement a mobile timecard entry application that uses proper cost codes and determines everything by job first must buy construction-specific accounting software capable of handling that type of information breakdown.

Choosing the Right Solutions
When it comes to investing in new technology—particularly SaaS or mobile solutions—contractors must look at their specific business needs and conduct the proper research before making any decisions. With SaaS, make sure the firm is ready and able to support the platform properly. With mobile solutions, it is crucial to have people and processes in place before choosing an application or device. Only then can contractors begin harnessing these new technologies to grow their business.

Four Ways to Get Project Teams Excited About Using New Technology

by Julian Clayton

Anyone managing construction project teams knows firsthand the pain of implementing change to employees' daily routines. If that change involves any sort of technology, the pain is increased by a factor of between 10 and 1,000, depending on the employee.

As painful as it can be, there are a few tricks to make these transitions smoother and ensure a greater chance of success. Following are four key points when it comes to rolling out new construction software.

1. Change slowly

The fastest way to failure is to change too much too fast. Employees

can become frustrated when they show up to work to find out their already busy day is going to become a lot tougher because they are expected to learn a new technology on top of everything else. If possible, change one or two small things at a time. Let workers see just enough to learn the basics of the system for a week or so. And before pulling the trigger on the full implementation, consult with users to make sure they have what they need to be successful in the change.

2. Sometimes they hate it just because

Some employees just don't like change and want to keep doing things the old, familiar way for as long as possible. These are the types of employees that will complain about any type of change, not just new technology. But once they get through the hard part of actually accepting they need to try some-



thing new, they can end up being the team members who praise the new system the most. It's helpful to keep in mind that every complaint is not valid and sometimes it's worth pushing through. Accepting failure too quickly is just as bad as changing too fast.

3. Prove value, not just for the company, but for the employees as well

There are two types of business software: top-down and bottom-up. Top-down software is something the office basically forces on the field. It's additional paperwork. "I'm here, and you're there with the information I need. Put that information on this form." While it provides benefit to those in the office, it's

just another task for the field. Implementation of top-down software often has one of two results. Either workers provide just enough information to comply with their employer's request (but they don't provide any of the real details), or they've been around long enough to know they don't really have to do anything new because no one is going to be in the field with them looking over their shoulder.

Bottom-up software can be implemented to gather information from the field as well. The difference is it actually benefits field workers. That benefit can be time saved (this will get daily reports faster than a notebook and a template) or increased quality of work (this will make it easier for subcontractors to know exactly what they need to do). Either way, implementing bottom-up software typically has a greater chance of success because it can improve the morale of those who are being asked to use it.

4. The rules do not have to be so strict

Loosening the reins for construction project teams can have some unexpected positive outcomes, allowing employees to get creative with how they use new technology. If possible, allow employees to use work-issued devices and software in their personal lives, rather than restricting them to just professional use. An open policy can prove to be very successful. For example, companies issuing iPads to employees should consider allowing those employees to use them at home and even pay for their iTunes accounts (within reasonable limits of course). This ensures employees get the apps they need, but it also gives them a sense of ownership over the device. This boosts worker morale, encouraging workers to take better care of their iPad, and to get excited about using it so that they really explore it and become expert-level users. This can eliminate the need for training, and ultimately saves on the cost of repairs and replacements.

With each successful implementation, companies build a base of trust with their team. Tread lightly, implement what works and not just what's cool, and work hard to make it an enjoyable and useful transition for all involved.

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Comings & Goings

Job Changes

Kinco Constructors is pleased to announce the addition of **Clay Gordon** as Vice President, Business Development. Gordon has over 16 years of experience in the construction industry. A former Arkansas Business 40 Under 40 recipient, Gordon will serve as a member of the Kinco management team and oversee the company's business development and marketing strategies. Gordon is a cum laude honors graduate of the University of Arkansas at Little Rock where he obtained a B.S. in Construction Management. He serves on the UALR Construction Management Advisory Board, the UALR EIT Leadership Council, the Arkansas Chapter of Associated General Contractors Board of Directors and numerous civic organizations.

Stribling Equipment LLC is pleased to announce that **Ryan Johnson** has joined their company as their CWP Light Construction Specialist.

BuildingPoint Mid-America announces the hiring of **Corey Bell** as their VDC Services Manager. Leveraging over 20 years of construction experience as an estimator, project manager, and preconstruction manager, Corey will be available to leverage an experienced back-office team to provide "just-in-time" VDC/BIM services to contactors.

Jason Van Pelt joined **Baldwin & Shell** in 2008 as a Systems Administrator in Central Arkansas. We are excited to announce he was recently promoted to Director of Information Technology.

With 12 years of experience at **Baldwin & Shell**, **David Williams** recently obtained his Master's degree in Business Information Systems and was promoted to Database Administrator.

Emily Grant joined **Baldwin & Shell** in 2014 as an Administrative Assistant and was recently promoted to Project Assistant for the Construction Services Team.

Having grown up in neighboring Sheridan, **Sierra Morris** is excited to join the Central Arkansas team as a Project Assistant at **Baldwin & Shell**.

Wes Herr has been promoted to Junior Foreman and **Jeff Bentley** has been promoted to Finish Foreman within the **McGeorge Contracting Division**.

Will Allen has joined **Crain Ford** of Little Rock as a Commercial Accounts Manager.

Chad Vanlandingham has joined the Crain Team and will be the Commercial Accounts Manager at **Crain Ford** of Jacksonville.

Danny Peacock has joined **Advanced Drainage Systems, Inc.** as the newest Sales Engineer in Northwest, Ark. Peacock, a resident of Rogers, comes to ADS with significant experience in the construction industry over the past two decades.

Nabholz recently promoted **Jeff Cumpston** to the role of Quality Management Director in the company's Northwest Arkansas office. Cumpston is a graduate of the University of Arkansas at Fayetteville. He began his career at Nabholz in 1997. In his 18 years, Cumpston has served the company as a laborer, foreman, field staffing coordinator, assistant superintendent and most recently as a superintendent in the company's Northwest Arkansas office.

Nabholz has appointed **Doug Bonds** to Senior Project Manager out of the company's Conway, Ark office. Bonds is a 22-year veteran of the industry with experience in the commercial, institutional, higher education and healthcare markets. He has played a key role in major healthcare construction in middle Tennessee and Central Arkansas including the construction of facilities at Vanderbilt University Medical Center, University of Arkansas for Medical Sciences, CHI St. Vincent, and Baptist Health. Mr. Bonds holds a Bachelor of Science Degree in Construction from the University of Louisiana in Monroe. He is an ASHE Certified Healthcare Constructor and has earned an ASHE Healthcare Construction Certificate, an AGC CM-Lean Certification, and OSHA 30-Hour Certification.

Nabholz has hired **Brandon Wall** in the position of Project Engineer out of the company's Rogers, Ark office. Wall has ten years of experience in the construction industry, and previously served as an assistant project manager in the special projects division of Burke Construction Group in Las Vegas, NV. Wall obtained an associate degree in architectural design from Northwest Arkansas Community College and a Bachelor of Science degree in construction management from Brigham Young University. He holds a CAD certification and has earned his OSHA 30 Hour certification.

East Harding Construction has promoted **Shawn Carroll**, LEED Accredited Professional (LEED AP), to the position of Senior Vice President – Operations and **Nathan Kerr**, Green Advantage Certified Practitioner (GACP), to the position of Manager – Field Operations.



Bell



Bonds



Brandon



Carroll



Cumpston



Gordon



Herr



Johnson



Kerr



Morris

Company News

The **Associated Schools of Construction Region 5** (Texas, Oklahoma, Arkansas and Louisiana) hosts an annual student competition that is **sponsored and paid for by the TEXO Association** (the largest commercial contractors association in Texas). The competition is a 3-day event that challenges students to apply all of the skills and capabilities they have gained through their construction management education to a real world situation. This is not a field construction exercise, but a project management exercise that entails estimating, scheduling, contracts, budget development, and a formal presentation to professionals in the construction industry. The projects this year were a \$20M LEED Gold school and a \$17M major modification to a waste water treatment plant.

There are three divisions - Commercial, Heavy Civil and Design Build. There were 11 teams in the Commercial Division, 7 teams in the Heavy Civil Division and 6 teams in the Design Build Division.

AGC Arkansas is very proud to announce the awards for our Arkansas teams:

John Brown University

First Place Commercial Division
First Place Heavy Civil Division
Best Presenter for Heavy Civil Division:
Ross Becker

University of Arkansas at Little Rock

Second Place Heavy Civil Division
Third Place Presenter for Heavy Civil Division:
Joseph Eggburn (AGC UALR Student Chapter President)



The JBU Heavy Civil and Commercial Teams both placed first.



UALR Heavy Civil Team earned second place.



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