



A Look Inside Construction

2018 Risk Trends

About this Publication

Liberty Mutual created this publication to provide insight into the Construction industry's current trends and associated risks. In this issue, the focus is on the industry's productivity challenge and how current trends can positively impact this challenge.

We'll cover the following:

01.

Construction Industry Challenge

Construction industry productivity challenges, risks, and associated trends

02.

Emerging Trends and Issues

A discussion of select trends' impact on the industry, associated risks, and productivity

03.

Macro Perspective

Key economic trends that we expect to have an impact on construction risk management

Featured Trend

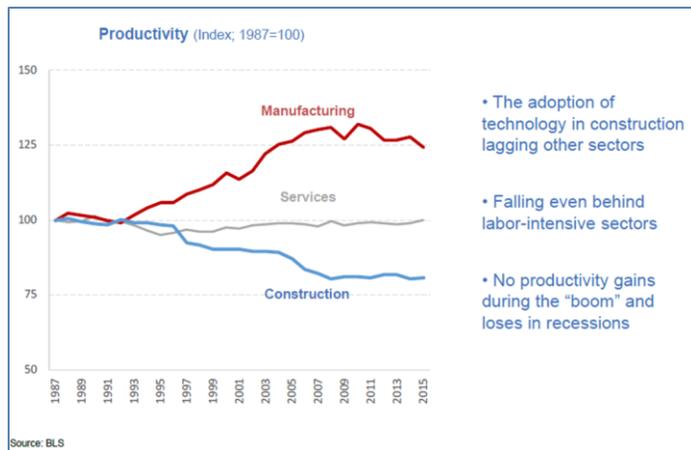
Each year, this section focuses on a trend that is currently impacting the industry. This year's selected topic is productivity in construction.

Section Overview

- The construction industry lags significantly behind other industries in productivity growth.
- Technology, digitization, workforce improvements, and process improvement offer clear ways to improve productivity across the industry.

A closer look at the productivity challenge in construction

Construction is a massive global industry, with more than \$10 trillion spent annually on construction goods and services. But a recent report by the McKinsey Global Institute finds the sector lagging significantly behind other industries in both growth and productivity. "In a sample of countries analyzed," the report states, "less than 25 percent of construction firms matched the productivity growth achieved in the overall economies where they work over the past decade."



By raising productivity, construction companies can make better use of resources, build higher-quality structures, and deliver more value to customers, which could translate into higher profits and better wages for workers. Given that the construction industry employs 7 percent of the world's working population and is responsible for building the structures where we live, work, and travel, it's clear that construction's stalled productivity is a problem worth solving.

The good news? If the industry boosted its productivity to match the rest of the economy, it could increase its annual value by a whopping \$1.6 trillion.

Labor productivity is a major reason for overall productivity losses in construction, according to the same McKinsey report. Consider that labor-productivity growth for construction averaged a disheartening 1 percent for the past decade, compared to 2.8 percent for the total economy and 3.6 percent for manufacturing alone.

Workforce shortages are partially to blame. A new report by the Associated General Contractors of America (AGC) found that 80 percent of construction firms are having trouble finding and retaining skilled workers, and that this nationwide shortage is increasing construction costs and delaying project schedules.

Workforce Improvements

Technology and Digitization

On a list of 22 domestic industries, construction ranked 21 for digitization, above only the agriculture/hunting sector. Building Information Modeling (BIM) has been a game-changer for the construction industry, helping to improve collaboration and coordinate workstreams throughout the phases of a project, but it's not enough. Today, construction firms hoping to drive increases in productivity are doing things like introducing wearable technology to improve worker safety and efficiency; using drones to scan, monitor, and map work sites; and leveraging virtual and augmented reality to train workers and provide engineers and construction managers with 3-D views of projects.

Process Improvements

Prefab construction can vastly increase overall productivity for many parts of the construction industry. The ability to construct the bulk of a project offsite in a factory, using prefabricated standardized components, is now within grasp – but it's still underutilized, according to McKinsey. Studies of companies that have adopted a production-based system suggest that this method could boost productivity five to ten times, and the industry is starting to catch on. The permanent modular construction (PMC) sector, for example, which delivers prefabricated single or multi-story module sections, grossed \$3.3 billion in 2016, which represents a whopping 61.8 percent increase from the previous year.

Integrated Project Delivery (IPD), Building Information Modeling (BIM), and Prevention through Design, are all processes that are gaining traction in construction, and each can have an impact on productivity.

When it comes to reduced productivity in the construction sector, there are factors beyond the industry itself that come into play. The federal government also has a role in overhauling outdated building codes, streamlining permit and approval processes, and investing in innovation, technology, and workforce training. But the industry cannot afford to wait. Firms that find creative ways to leverage new technology – including mass production – and to recruit and train new workers should have a clear competitive edge in the decade to come.

Section Overview

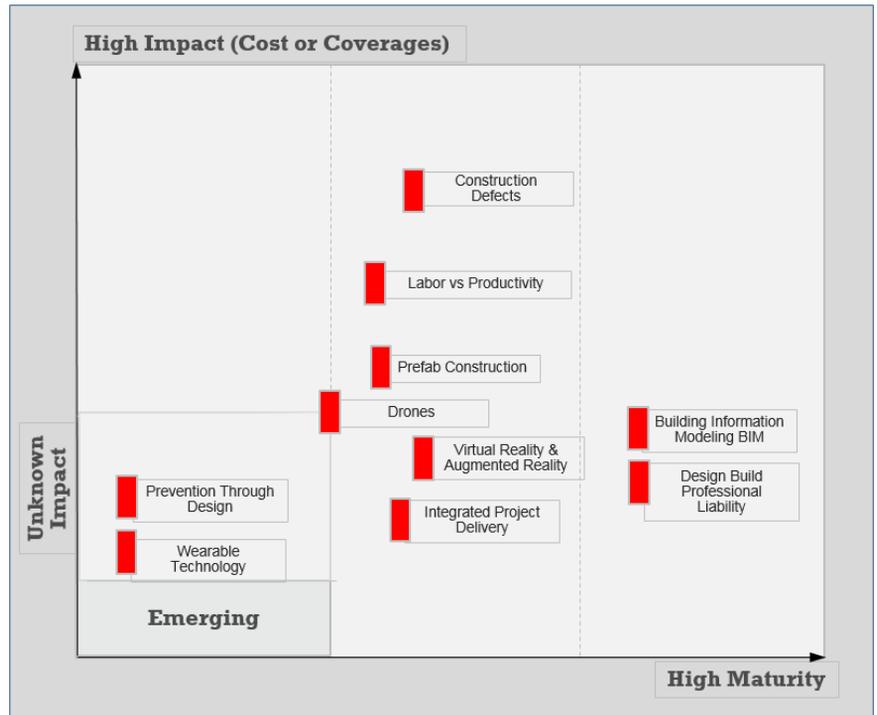
- Workforce Improvements
- Trends in Technology
- Process Improvements

Emerging Trends and Issues

This section presents a compilation of the major trends and issues impacting risk management decisions for the construction industry. A number of trends and issues that are deemed current and relevant are chosen and discussed in this section as well as the impact these trends have on the construction industry.

Our key focus areas for this year's publication are evaluated in the context of their impact on productivity and risk.

Construction Industry Trends and Lifecycles



Construction firms are learning and adopting new technologies, processes, systems, and techniques to work smarter, faster, and safer while innovating and testing forward-thinking technologies. Trends in construction addressed in this section are categorized under three groups: Labor versus productivity, trends in technology, and process improvements.

I. Workforce Improvements - Impacts of the Current Labor Shortage



70%

of AGC of America survey respondents say they are having difficulty filling craft positions

The construction industry is experiencing a labor shortage that is having a direct impact on construction costs, timelines, and final product deliverables. The Associated General Contractors of America (AGC of America) conducted an online survey of contractors in July and August 2017 that surveyed 1,608 respondents. Seventy percent of these respondents indicated that contractors are having difficulty filling craft positions. The position of a carpenter was reported to be the toughest to fill. Factors influencing the current construction labor shortage include:

- The construction workforce is aging. Construction industry average worker age is slightly older than workers in the rest of the economy, with a median age of 42.6. Baby Boomers employed in construction are retiring from the workforce.
- Not enough young people are choosing careers in construction to replace retiring workers. Only 1.8 percent of the industry's workers are between 16 and 19 years old, while fewer than 9.4 percent are younger than 25. Both percentages are shy of national averages for all industries.
- During the recession of the 2000s, many workers left the construction industry for the energy sector – and never came back.
- Uncertainty about immigration policy and promises of stronger immigration enforcement are scaring away even legal immigrants from the industry.
- Increased drug testing and the opioid epidemic may deter candidates from applying to jobs in the field.
- Budget cuts to shop and skill development opportunities in high schools, along with an emphasis on pursuing a college education versus technical education, has eroded trade labor pools.

Workplace injuries and construction defects are indirect consequences of a tightening labor pool that have a direct impact on productivity. Severe catastrophic injuries can remove a worker from the workforce completely, resulting in lost productivity from the loss of the injured worker, time spent training replacement workers, and an increase in administrative tasks. Additionally, inexperienced workers are more likely to increase the risk of onsite accidents and injuries, and also trend toward poorer quality work that can potentially evolve into construction defect claims.

Current contractor responses to labor shortages include working overtime, as well as working weekends. A prolonged practice of working current employees harder and longer results in fatigue and reduced morale. Loss of focus and concentration due to fatigue presents a greater risk for worker injury and reduced work quality.

Other approaches contractors are taking to push productivity, meet timelines and deadlines, and get to the next project include:

- **Stacking of Trades – Joint Occupancy – Concurrent Operations.** This results in multiple trades working in the same limited space and close proximity to each other. This practice increases noise levels, construction dust, and occupational disease exposures, as well as housekeeping challenges that present struck-by and same-level slip, trip, and fall exposures.
- **Mobilize/Demobilize – Reassignment of Manpower.** Moving workers from one project to another results in work delays, disruptions and lost productivity. Excess change and constant work-site reorientation is another ingredient that can affect work quality and increase worker injury potential.

So what are contractors doing to address this labor shortage? Several approaches are under way to address this labor demand versus supply dilemma. Increasing pay or wages is one approach but the impact of this method may be short-term. Some specialty trades may be experiencing worker shortages, and economists are finding wages to be stagnant. Specialty trade contractors including non-union contractors are also developing and operating state-certified apprenticeship programs in hopes of creating their own future labor pipeline of skilled labor. Establishing apprenticeship programs comes with a four- to five-year tail to Journeyman status, so the impact of this method will not alleviate the current labor shortage for several years. Many contractors are investing in local high school vocational training programs, bringing back these programs that have faded due to cultural trends steering students toward college and reversing school budget cuts in trade education. There is also a movement to support more women in the construction trades. The U.S. Bureau of Labor statistics report that females hold just 2.6 percent of construction occupations.

The current booming economy has certainly caused contractors to rethink the future of their business and take more creative approaches to worker recruiting and staffing. The near future will continue to present productivity challenges in the construction arena.

Sources:

- U.S. News – Where Are All the Builders? - Andrew Soregel – 6/15/18
- Real Estate & Construction Blog – Cherry Bekaert 10/18/17
- Association of General Contractors – Confronting the Labor Shortage Crisis in Construction – Kenneth D. Simonson, Chief Economist – 2018
- O2 Employment Services – How Workplace Injuries can Seriously Affect Your Bottom Line – Michelle Dell – 1/18/18
- Mason & Mason Blogs – 2018
- Construction Dive - 4 Ways Builders Are Working Around Labor Shortage – Jeff Marcus – 2/8/17
- Professional Builder – A Simple Answer to the Labor Shortage – Doreen DiPolito – 8/28/15

II. Trends in Technology:

Building Information Modeling: BIM and Productivity

BIM, or Building Information Modeling, is a process allowing architects, engineers, and general contractors to create a digital representation of a construction project usually in 3D design. BIM is being used and required by owners for use by their design and engineering teams, construction managers, and general contractors with increasing frequency. One study (Hegunsel et. Al., 2011) indicates that BIM use in the design phase "...should reduce the number of errors resulting from traditional design documentation (Clash Detection) thereby avoiding many errors on the construction site." In and of itself, any reduction of errors prior to actual construction should ultimately lead to improved field productivity. Moreover, the study identified increases in productivity through identification of errors in design and coordination before construction. The leading uses of BIM are not only for clash detection but also for visualization, building design and assembly, and construction sequencing. We most often see BIM associated with mechanical, electrical, and plumbing (MEP) systems in building construction – probably due to the intricacies of these systems and how they relate and conflict to one another in building designs. One project evaluated (*reference 2*) the impact of productivity on a small mechanical contractor who used BIM. The findings suggested productivity increases ranging from 75 percent to 240 percent where prefabrication and BIM were both used. Because BIM allows project teams to consolidate all information related to a project in one centralized place, it allows for the ability to communicate with the project team during all phases of the project. It also facilitates improved coordination of workstreams and allows for different scenario-based calculations on projects to help optimize cost. Many construction professionals agree that BIM is starting to become a necessity. According to Transparency Market Research, the BIM market is expected to see a 19.1 percent CAGR from 2015 to 2022.

BIM can provide tangible business benefits and optimization at all levels of a construction project, especially projects that are diverse and involve complex infrastructures. BIM can help increase efficiency in project management by allowing multiple groups to collaborate and coordinate in a much more streamlined fashion. It also provides project managers and general contractors with more insight and control over the speed and cost of project, thus allowing for increased efficiency and positive impact on profitability and productivity.

Sources:

- Benefits of Building Information Modeling for Construction Managers and BIM based scheduling by Mehmet F Hergunsel, 2011.
- Measuring the impact of BIM on labor productivity in a small specialty contracting enterprise through action-research; Erik A.PoirieraSherylStaub-Frenchb1DanielForguesa2

Virtual Reality and Augmented Reality

One important and rapidly evolving area for all industry segments is application and adoption of virtual and augmented reality technology, and the construction industry is no exception to this trend. Key stakeholders involved throughout the project lifecycle, including designers, engineers, and project managers, can use VR/AR techniques to support existing approaches in areas like planning, change management, as well as training, all of which can lead to productivity benefits. Collaborative project planning with VR/AR, similar to technology supporting BIM, can integrate design details and ensure that all the components seamlessly come together. In areas where changes may be necessary, VR/AR can provide a useful visual into impacts without the need for potentially costly physical mock-ups. Marketing departments can use this technology as a way to provide customers with a real-time view of the finished product including, placement of facilities, walls, doors, bathrooms, etc. Changes can then be made in real time based on the desired design features. Similar to BIM, engineers and construction managers can use VR/AR to identify potential construction defect concerns, implement design details or construction processes not frequently used and evaluate design specifics relative to both the structural integrity and end user. In the training space, VR/AR techniques can offer not only an alternative to hands-on activities, but also accelerate the learning curve by facilitating virtual practice walkthroughs and allowing for trial-and-error insights.

Wearable Technology

Wearable technology is clothing or accessories that incorporate advanced technology, and these devices can be used in the construction industry to monitor employee physical conditions as well as location in order to more effectively manage employee and job site safety. With the popularity of wearable technology recent growth in consumer markets, the construction industry has quickly adapted these product features for both safety improvements and productivity oversight strategies.

With the use of wearable technology, safe working practices can be monitored more efficiently and unsafe circumstances can be addressed before an accident occurs. It also allows for a more rapid response if a worker has an incident such as a fall and requires immediate assistance. Construction firms can also leverage wearable data to evaluate worker movements during shifts and explore opportunities for increased efficiency in areas like location of material deliveries, location of material trailers, and positioning of entrances/exits, for example. This technology can also be valuable when dealing with lone worker exposure, as it can automatically detect when a worker is injured and send out a notice to supervisors or emergency personnel in situations where the worker may not be able to call for help. This control over lone worker exposure is one of the most valuable impacts of wearable technology.

Prior to using wearable technology processes, standards, and maximum tolerance levels should be determined. Consistent standards will ensure that unsafe practices

or occurrences that need to be mitigated or stopped have been quickly identified so the processes to resolve them can be put into place. Improved safety practices, combined with a more efficient job site, can clearly lead to tangible productivity benefits in construction.

Wearable devices may be most effective when complemented with additional technology that provides visual monitoring and integrates employee data with project data (e.g., BIM, drones, etc.) and equipment tracking, providing risk managers and project managers a more holistic view of the job site.

Unmanned Aerial Vehicles (UAVs) / Drones

UAVs are increasingly popular in the construction industry as contractors are relying on these small motorized devices equipped with cameras to help capture images of construction sites or to send live videos from job sites. The goal of using UAVs and drones is to help enhance communications between project managers and the field, allow for job site surveillance to increase worker safety, and reduce material and equipment theft. UAVs and drones have the ability to provide real-time inspection and surveillance of the job site using devices such as high-definition videos, still images, and light detection and ranging (LIDAR) to create 3D models.

While there are still some concerns surrounding privacy, there is no doubt there are some significant benefits that the industry can leverage from the use of these devices. The exposure to potential liability from drones has affected the aviation insurance marketplace, creating an increasingly more competitive and robust, but also evolving, marketplace for companies who are looking to insure possible liability from the use of drones in their business.

One of the major benefits of using UAVs and drones is that it allows builders to leverage the data gathered to conduct preconstruction simulations. This gives builders the ability to test various hypotheses and designs which will ultimately help lower the chances of error for when actual construction is in effect. This can directly translate into providing a better understanding of job site safety. Also, the ability to perform construction tasks remotely and unmanned will help decrease the likelihood of worker injuries, because contractors will be able to monitor job sites to ensure that safety measures are being taken by workers and that inspections are being conducted on a more timely basis.

As the use of drones continues to evolve, we will likely see direct and indirect positive impact on safety, risk management and productivity.

III. Process Improvements:

Integrated Project Delivery (IPD)

IPD, or Integrated Project Delivery, involves the collaboration of all project participants including at a minimum the owner, contractor, and designer but also possibly the subcontractors and suppliers as well to successfully to deliver the project. Agreements can include the allocation of liability, cost sharing, project goals, and other responsibilities. This maturing construction process has seen 10-plus years of implementation with most of the benefits and challenges remaining relatively unchanged. Benefits of utilizing an IPD system include better adherence to the project schedules, improved efficiency, reduction in change orders, and increased collaboration across stakeholders. Challenges continue to be all contractors agreeing to uniformly share risk and responsibility for the project's success or failures. Although many contractors define the IPD process as a "relational" contract, one construction market niche IPD has been successful in are OCIPs. Controlled insurance programs eliminate many of the risk sharing pain points subcontractors express when IPD is implemented on non-OCIP programs. Higher rates of IPD success are observed on private projects (versus public bidding) when GCs and owners can selectively choose the subcontractors best suited for this type of project management process.

As IPD is still in the early stages of adoption, concerns regarding contractual relationships and the allocation of liability have been a challenge for the construction industry to overcome. Increased collaboration among the parties to a project—from the onset—seems destined to become the fundamental strategy for reducing risk in the future and improved productivity.

Prevention through Design (PtD)

All organizations have a limited amount of safety energy to spend. Those who seek and achieve world-class safety results do not spend more safety energy than those with lesser results; they just distribute it differently. When a construction company focuses exclusively on downstream activities, it can't help but maintain a safety culture that is lagging. It's about who had the incident, how they got hurt, what their claim costs are, and what they did or didn't do. This type of thinking goes nowhere, and in time, the very limited safety energy is squandered and no lasting results are achieved.

When a construction firm shifts its safety energy upstream, firm leaders become more system-focused and aware of their many system discrepancies and how they directly produce risk that results in workers' injuries and property damage. They understand incidents as a function of a system that got out of whack, versus "carelessness." Contractors that are upstream, focused with the will to improve over time, generally outperform their downstream peers in terms of safety. Prevention through Design is as far upstream in the construction process as a contractor can go.

Prevention through Design (PtD) refers to designing systems, facilities, and work processes with risk reduction in mind. Its purpose is to anticipate risk producing hazards before they materialize and to incorporate risk reducing solutions into the initial plans and specifications (or even at the conceptual stage) of a project. The National Institute for Occupational Safety and Health (NIOSH) currently leads a nationwide initiative called Prevention through Design (PtD). According to NIOSH, “PtD addresses occupational safety and health needs by eliminating hazards and minimizing risks to workers throughout the life cycle of work premises, tools, equipment, machinery, substances, and work processes including their construction, manufacture, use, maintenance, and ultimate disposal or re-use.”

Before any new construction or renovation project begins, consideration should be given to where risk lies, with systems then developed to eliminate or reduce those exposures. Similar to pre-planning, this requires looking even further upstream. A thorough PtD process provides a safer, easier, and more productive work environment. There are many benefits and advantages to the organization from effective implementation of a PtD process:

- Cost savings: Designing out risk contributing factors avoids costly retrofitting of a project, structure or process. Additional cost savings include elimination or reduction of occupational injuries, injuries to the public, improved productivity, and lower maintenance costs.
- Employee acceptance: Employees are more accepting of safety solutions and procedures when they are involved in the design review process. Employees better understand the risks they encounter and can offer solutions to eliminate, design out or control the risks.
- Improved efficiencies and productivity: Attention to design can eliminate steps, processes, PPE use or other time consuming components of an operation that add little value to the task.

PtD is taking hold as an exciting, new approach to how buildings are designed, engineered, and constructed. The most effective approach to preventing harm-producing incidents is to reduce the risk that contributes to them. Addressing system factors that give rise to risk, as far upstream as possible, is key to sustainable prevention of events that cause harm to people that build, work in, and visit the structures we occupy.

Prefab Construction

Another industry trend having an impact on both safety and productivity is the growing use of prefabricated construction also referred to as offsite or modular construction. Prefab or modular construction leverages the benefits of operating in a controlled environment with good housekeeping and a full supply of equipment that may not be available or practical on a job site including welding machines, power tools, and overhead cranes. This process is particularly beneficial for work completed by HVAC, plumbing, and electrical contractors who can construct and deliver ready to go systems like “plug and play” electrical panels or complex duct work. In addition to the aforementioned, prefab of material offers several additional advantages compared to onsite fabrication:

- Increased QC controls due to in-house fabrication in a controlled environment, away from extreme cold, heat, and precipitation.
- Reduced WC exposures due to work being conducted in a controlled shop setting where tools such as overhead cranes are available, to reduce manual material handling; tabletop work, as opposed to working on the floor; improved housekeeping; and ample space to store material and finished product. All this leads to reduced exposures to workers compensation injuries such as soft tissue injuries and trips/falls.
- There is typically an increase in productivity, since all of the pre-fabrication can be preplanned offsite and then delivered to the site in coordination with the installation. Fewer tools, and less equipment and material, have to be delivered onsite since all of the fabrication is conducted offsite; only installation is required onsite. When applied to the right projects, prefab methods can have an increase on productivity since the work is preplanned and able to be delivered to the site for installation at the scheduled time. While the delivery of these systems does require some different logistical planning and execution, the advance coordination can minimize the need for the typical onsite activities related to various materials needing delivery, delays due to weather, and so forth. A 2017 Forbes article reinforces the link to productivity by noting that “when done correctly, offsite construction can benefit a project’s schedule, budget, and skilled labor requirements.”

Sources:

- Forbes article <https://www.forbes.com/sites/bisnow/2017/08/02/the-rise-of-the-prefabricated-building/#3198d91c1dd5>

Construction Defects

The complexity of erecting a structure provides ample opportunities for defects to creep in. Construction projects often include multiple stakeholders, such as general contractors, designers, engineers, subcontractors, and material suppliers. Defects can have a disastrous effect on structural elements. They may ultimately cause settlement, damage, or collapse of a structure. Defects may impact mechanical systems such as heating, cooling, and plumbing, and result in leaks that lead to damaged drywall and mold issues. They may also occur during the construction of cosmetic features, with results such as cracks in plaster. Causes of failure can include defective building material or components, engineering and design errors, and installation errors. These conditions may result in completed operations claims which include:

- Breach of contract or warranty: The equipment was constructed properly but didn't last as long as the warranty.
- Personal injury: For example, the building's entryways were constructed, and after occupancy, someone tripped and fell as a result of the walkway design or installation.
- Loss of use - Business interruption or other financial loss: For example, a water leak occurred over critical computer systems.
- Attorney fees: Regardless of the outcome, defending a case can result in attorney, engineering, and expert witness fees.
- Punitive damages: Damages for disregarding existing building codes and industry standards.

Construction defect claims can affect a contractor's reputation, profits, and ability to maintain insurance coverage. One large claim can cripple a business if it doesn't have the right risk management plan in place.

There are several strategies that can be implemented to reduce this risk and minimize the financial and reputational damage stemming from these challenges. They include:

Examine scope of coverage and contractual protections

- Assigning accountability if certain aspects of a project turn out subpar can be difficult without clear guidelines in place. Before the start of a new project, the general liability policy should be scrutinized along with limits, exclusions, and exceptions. Higher limits may be required in certain states. Coverage gaps need to be minimized by considering excess, professional, and pollution liability in addition to property policies. These coverages can be key safeguards in the event of a large claim, or if an incident isn't covered by your general liability policy. Comprehensive coverage reviews are especially important if the organization is involved in either owner-controlled or contractor-controlled insurance programs for design-build, integrated project delivery work, or "wrap-ups." Legal and financial responsibilities within the contract need to be clarified. Some states, for

example, may limit a contractor's ability to transfer certain liabilities and risks to subcontractors. All stakeholders are contractually responsible for their own work. Review each party's certificate of insurance or additional insured endorsement for adequate coverage levels. Also check if there are any endorsements, such as a residential construction exclusion or state anti-indemnity provisions that might affect coverage.

- Maintain a robust quality control program

Continuous collaboration on quality control is one of the best ways to avoid construction defect claims, improve safety, and limit costs associated with delayed delivery dates and rework. In fact, nearly all the contractors participating in the Dodge study (91 percent) agreed that collaboration is a fundamental strategy to reduce these risks. Traditional quality control programs consist of a two-step process: the contractor reviews the plans and specifications for errors before the start of a project, and once construction is underway, implements an informal or formal inspection process. A formalized and well-documented quality control program that focuses on processes and systems, versus rework and blame, can reduce the chance of construction defect claims. Standards should include how field supervision will implement the quality control program. The guidance document should also include guidance on how supervisors must implement and encourages innovation, continuous improvement, worker involvement and customer feedback. The key to collaboration is taking advantage of everyone's expertise.

- Control claim-related costs

There's no question that construction defect litigation can be time-consuming and expensive. The key to mitigating the cost of a claim will center on having close ties with your insurer. Inform your insurer of potential claims immediately and be ready to provide project-related records. Also, notifying other involved trades and issuing contractual-based tenders early on is important. While receiving a favorable verdict can be satisfying, it may not provide the best financial outcome. With that in mind, all claim resolution strategies need to be fully considered.

Sources:

- New Research Shows How Collaboration Can Reduce Construction Risk. Dodge Data & Analytics 2018
<https://www.construction.com/news/new-research-how-collaboration-can-reduce-construction-risk-jan-2017>

Macro Perspective

Understanding the external environment is essential when formulating strategies for the upcoming year. This section summarizes macroeconomic trends that impact the construction industry.

Tax reform expected to have positive impact on the construction industry

The Tax Cuts and Jobs Act passed in late 2017 is anticipated to have an overall positive impact on the construction industry. Construction firms set up as C corporations will see their overall corporate rate lowered from 35 percent to 21 percent. The American Builders and Contractors group has estimated that the vast majority of construction companies will have their effective tax rate lowered by 10 percent. The new tax legislation is anticipated to most acutely benefit small and mid-sized firms that had traditionally relied on bank loans to expand. The expectation is that the additional capital on hand as a result of the tax cuts should allow firms to reinvest in new hires and equipment. According to the December 2017 Construction Confidence Index, 55 percent of construction firms expect their profits to grow in the first part of 2018. Additionally private bond financing remaining tax-free will keep capital flowing into public projects which should further fuel growth. Lastly, American corporations are anticipated to move some of the \$3.1 trillion in assets they currently have invested abroad back into the United States in the form of property and facilities purchases due to the tax law changes.

OSHA proposing rollback of reporting rule on large employers

On July 30, 2018, OSHA, part of the Department of Labor, proposed a rollback on a rule that was first enacted in March 2016 and required all employers with more than 250 employees to electronically report their detailed workers' compensation injuries and illnesses. Under this new proposal, the detailed reporting contained in Form 301 would no longer be a reporting requirement for larger employers. However the summary form for all workers compensation injuries and illnesses, Form 300A, would still need to be completed.

While this move is primarily seen as part of the Trump administration's efforts to undue perceived red tape, there were additional concerns that the more detailed injury information contained in Form 301 could compromise the privacy of employees since that information could be accessed via a Freedom of Information Act request. The National Association of Home Builders has also long opposed providing this level of detail, arguing that it puts an undue cost onto construction firms and also exposes propriety information such as hours worked. Currently, OSHA has only received the Form 300A on approximately 153,563 of the total expected 350,000 worksites due to confusion about the requirement and users' unfamiliarity with the web-based reporting system.

OSHA allowed public comment on this issue until the end of September 2018.

Bi-partisan senators introduce the IMAGINE ACT

A group of bi-partisan senators has introduced the IMAGINE Act, which will support research and investment for state-of-the-art construction materials that will be used to repair the nation's aging infrastructure. The expectation is that the use of these materials will improve construction timelines and the new materials will also be more resilient to water-related damage such as flooding and corrosion, therefore allowing new projects to have a longer lifespan. Some examples of materials covered by this act include high-performance asphalt, geosynthetic materials, and reinforced polymer composites. Right now under the IMGAINE Act, \$65 million would be given to the Federal Highway Administration to promote innovative materials on bridges, \$65 million to the EPA to promote cutting-edge products on water-related infrastructure, and \$8 million to Fairbank Highway Research Center for research into the development of new materials.

Other Related Business Trends

Urbanization

In 2014, 54 percent of the world's population resided in urban areas and by 2050 that percentage is anticipated to be as high as 66 percent, resulting in an increased demand for retail space, offices, and parking garages for city dwellers. It is anticipated that the U.S. will be in line with this global trend. Consequently, an increase in the urban population will result in an increased number of construction projects being completed in more congested urban areas, with those projects having a significantly higher percentage of vertical work.

Autonomous vehicles

In the fall of 2017 Colorado Department of Transportation became the first state agency to incorporate a driverless truck into a road project. Construction zones on roadways have also posed a significant challenge to developers of autonomous vehicles. Since detailed databases of road construction sites are not kept, there is no method to automatically alert a car to the existence of a construction site or provide it with programming as to how it should respond to this increased hazard. Without being able to collect data on cars driving through construction zones it is difficult for developers to write an algorithm to help autonomous cars operate in those areas safely.

Mergers and acquisitions

Though a vote on future infrastructure work is not anticipated until after 2018 midterm elections, companies have started to position themselves for bigger infrastructure jobs once they become available through mergers and acquisitions. M&As are being seen as a way to both expand the geographic scope of operations and also address the qualified labor shortage in the construction industry. While the number of M&A deals in the construction space in 2017 was roughly the same as 2016, the size of the 2017 deals were significantly larger. More specifically, design and construction firms have been acquiring construction firms to fuel their growth for larger projects.

Opioid abuse in the workforce

In 2016, more than 42,000 people died from an opioid overdose and 40 percent of those deaths involved a prescription opioid. More than other industries, the construction industry feels a greater impact from this crisis due to the prevalence of injuries from falls, lifting, bending, and twisting that occur on jobsites. The subsequent medications taken by workers to alleviate chronic pain can easily turn into dependencies over time. A recent study by the Commonwealth of Massachusetts' Department of Public Health found that, in comparison to other industry sectors, the construction industry has an opioid-related overdose death rate close to five times the average in the state, at a rate of 124.9 per 100,000 workers for construction, as compared to a rate of 25.1 per 100,000 workers for all industries.

The development of an opioid dependency can also result in additional time missed from work – even when compared to workers with other forms of substance abuse. Workers with prescription pain medication use disorders miss, on average, 29 days per year in comparison to 14.8 days for those suffering from other substance abuse disorders, and 10.5 for most other employees. Another concerning element on the rise is the increase in frequency of jobsite drug overdose. Between 2013 and 2016, the rate of overdose deaths due to non-medical use of drugs and alcohol increased at least 38 percent annually, according to the Bureau of Labor Statistics.

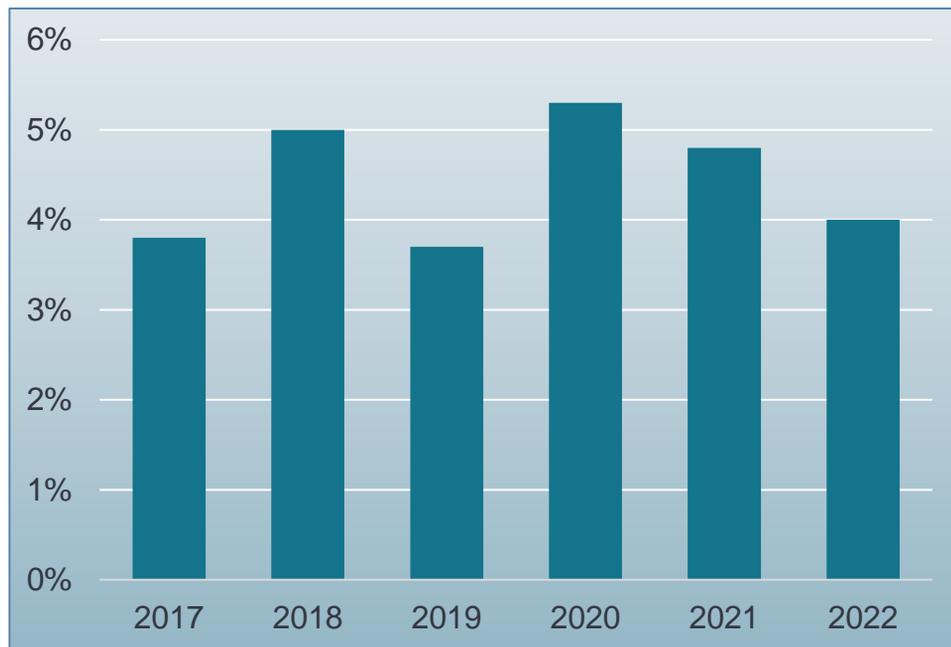
Right now, construction firms are placing particular focus on teaching proper lifting techniques and other preventive measures, to slow the occurrence of injuries that are frequently treated with narcotics. Training on how to provide aid to workers who suffer an overdose on jobsites is also being implemented. Additionally, some states have begun imposing limits on opioid prescriptions and implementing monitoring systems that help identify abusers.

Construction Industry Forecast

Future growth of the non-residential construction space

Growth rates in the non-residential construction space are anticipated to be around 4 percent annually through 2022. Through the first four months of 2018, spending was up 5.1 percent, most notably with increases in the transportation and lodging sectors. Nashville has proposed a \$5.2 billion infrastructure project focused on transit; Minneapolis and Boston are also looking to spend \$1.9 and \$2.2 billion respectively on upgrading their existing rail systems.

Industry forecast: The value of nonresidential building construction spending is forecast to grow at an annual compounded rate of 4 percent between 2018 and 2022. Data published: January 2018.



First Research forecasts are based on INFORUM forecasts that are licensed from the Interindustry Economic Research Fund, Inc. (IERF) in College Park, Md. INFORUM's "interindustry-macro" approach to modeling the economy captures the links between industries and the aggregate economy.

Federal funding for asphalt projects is expected to increase by 15 percent, or \$7 billion, in fiscal year 2018 over fiscal year 2017, which will positively impact highway construction demand. The total investment in asphalt projects is anticipated to be more than \$44 billion.

| Industry | Forecast % change | |
|-----------------------------|-------------------|------|
| | 2018 | 2019 |
| Nonresidential total | 4.7 | 4.0 |
| Commercial total | 6.7 | 3.4 |
| Office | 6.6 | 4.1 |
| Retail and other commercial | 6.3 | 2.7 |
| Hotel | 7.9 | 3.6 |
| Industrial total | -0.1 | 4.9 |
| Institutional total | 4.5 | 4.5 |
| Health | 4.7 | 4.4 |
| Education | 4.0 | 5.2 |
| Religious | -4.1 | 0.0 |
| Public safety | 10.9 | 5.9 |
| Amusement and recreation | 4.0 | 2.8 |

From the Consensus Construction Forecast, June 2018.

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