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November 2019

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Innovative Technologies, Materials Push the Construction Industry Forward

A host of new technologies and innovative building techniques and materials are reshaping construction projects, offering the potential for increased efficiency and profitability. In some cases, though, those innovations are also introducing some new risks builders must consider.

"Automation is no longer just a luxury, and digital transformation is no longer just a buzzword," said Matt Nordaker, vice president at Marsh. "The economy is changing, faster than any other time in industrial history, and to not be ahead of the curve is a monumental risk. Not employing big data in an effective way is a risk. Not gaining insights on new tech is a risk. If you aren't discussing, investing, piloting, then extinction is a real risk. That is what's at stake."

One innovation that's bringing together several technological developments in the design, engineering, and construction process is building information modeling (BIM). BIM is an intelligent, three-dimensional (3-D) software modeling technology that gathers data about a project and all its components throughout the project life cycle.

Among BIM's benefits are facilitating scheduling, potentially identifying problems before they occur and reducing the need for rework, identifying how one change might affect other aspects of the project, and adding efficiency to the construction and operation of the structure.

"BIM is great for clash detection and virtual modeling," said Rose Hoyle, strategic operations manager for Risk Engineering at AXA XL.

"It's an incredibly useful tool. You can identify a clash before it occurs in the field; you can see, for example, that the ductwork is going to interfere with drain piping."

Beyond three dimensions, BIM can also add the dimensions of time (4D) and cost (5D) to the project model.

Among the various BIM applications being embraced are electronic field scans to identify any embedded item misplacements before a concrete floor is poured, according to Craig Durgarian, assistant vice president and principal risk engineer at Zurich.

"Before you pour the floor, you can compare the field locations of the embeds to the three-dimensional virtual model that can tell you, hey, embeds X, Y, and Z are shifted by a foot; fix those before you pour the floor," Durgarian said. "That checking has been done forever, but it's been done much less efficiently with a transit, a tape measure, and a set of hard-copy drawings."

Of course, the quality of a BIM model's output depends on the quality of the input, Rose Hoyle noted. "So, making sure everybody's feeding the right data into the BIM model as it changes during the life of the construction process is the challenge," she said.

Moving forward, this digitization of the construction process will be connected with artificial intelligence to make even better use of the data being collected, according to James Boileau, Construction Segment director at Zurich.

"Artificial intelligence can be used from looking at the BIM model and finding problems automatically to overlaying 3-D photographic documentation with the model, to determine whether the right component is going into the right location," Boileau said.

"We're not there yet, but that's the direction that the digitization of construction is going," he said. "We're looking more and more at how can we confirm that things are in the right place and that they're the right materials."

Blockchain is another technology with potential benefits. An unchangeable distributed ledger technology designed to ensure the authenticity of each entry in the ledger, blockchain can be used in such areas as tracking supply chains and materials, project modeling, and smart contracts, according to Matt Nordaker.

Applying blockchain to material orders and shipments, "If there is a timing issue, you can figure out exactly when it occurred. If there is a material defect, you can figure out exactly where that occurred," Nordaker said.

Using it in association with building modeling could provide a definitive ability to track changes or any deviations from original plans. "Things always change on a project," Nordaker said. "Blockchain can track the changes, who changed it, and allow you to retrospectively verify what happened and who did it in a very granular way."

> *"If you aren't discussing, investing in, piloting, new technology then extinction is a real risk."*

Meanwhile, blockchain-enabled smart contracts coupled with digital wallets can allow contractors and subcontractors to be paid as milestones are reached, reducing the time associated with making payments and smoothing cash flows.

"It's going to take some time, but if these conversations aren't happening internally at construction firms, they're missing the boat," Nordaker said.

During periods like the present in which gross margins and fees are compressed, construction companies are using technology and analytics to remain competitive and manage their business, according to James Tressel, senior vice president and chief underwriting officer at Liberty Mutual Surety. "Avoiding problems by detecting them before they occur and learning from past problems is essential as firms try to protect their profit," he said.

The tight margins in today's market also dictate a heightened focus on cost controls, he said. Using technology to vigilantly monitor cost variances allows firms to address issues before they escalate and develop into larger problems. Daily and real-time reporting of information from job sites allows such analysis. Job site cameras and video add another dimension to data and documentation. Beyond technology, firms recognize the downward pressure on margins and are seeking opportunities to supplement fee income by providing some degree of self-perform work or other fee-generating services.

"Looking forward, firms that are investing in analytics and technology as a way to enhance results will be in a good position to manage through market changes," Tressel said.

Innovations in the construction industry aren't limited to software and analytics. There are innovations in building materials as well, notably increased use of mass timber and laminated wood in large projects.

"Mass timber isn't your average 2x4. One of the characterizations we've used is this is like plywood on steroids," said Bob Haskell, executive underwriter and product line manager at AXA XL.

Cross-laminated timber is becoming a popular type of construction, particularly on the West Coast, said Sedat Kunt, managing director at Marsh. "We can all agree this is an environmental play. The global companies, whether you call it a fad or being socially responsible, everyone is a little bit focused on reducing their carbon footprint."

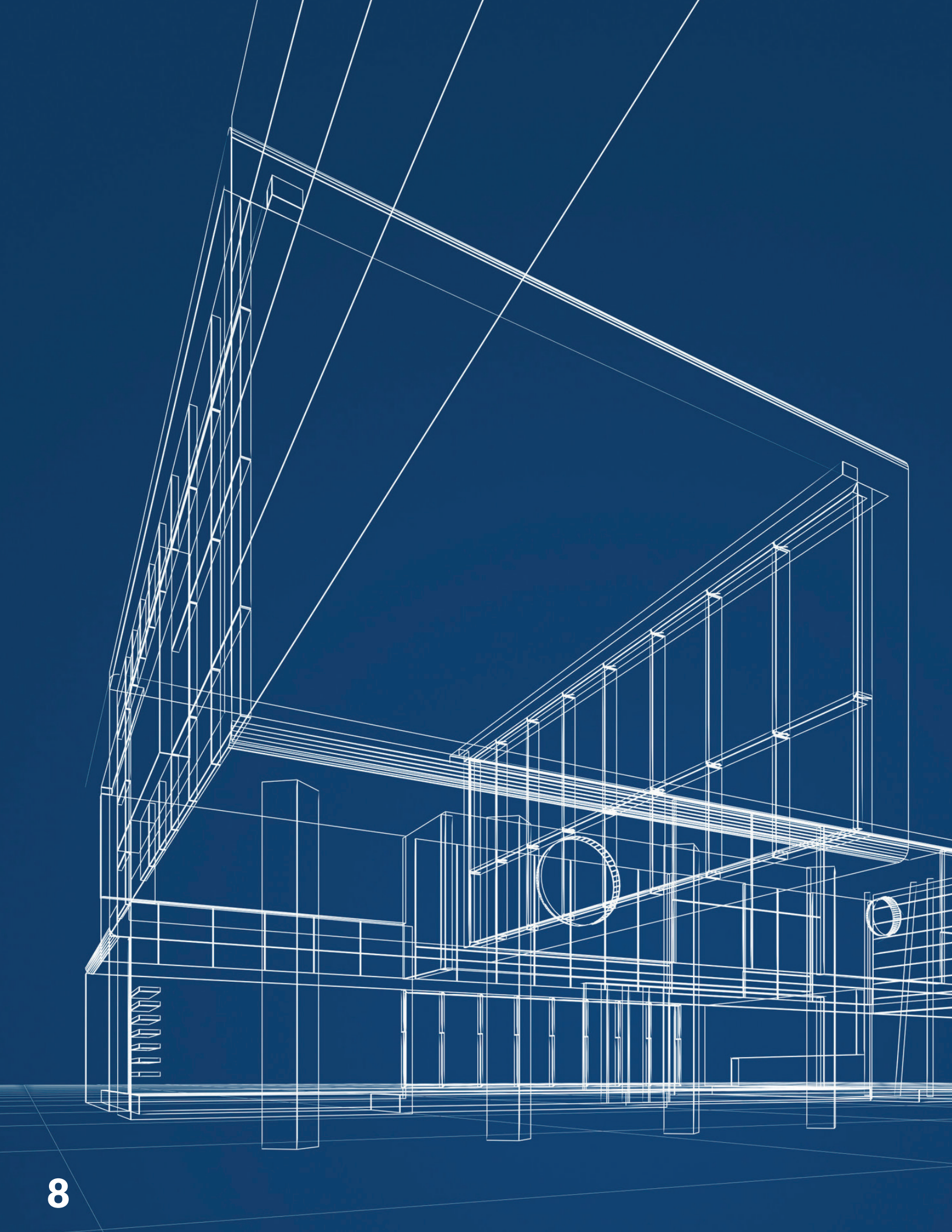
The material is popular in earthquake areas due to its resilience and potential cost-savings over other materials, Kunt said. There are potential risks, however.

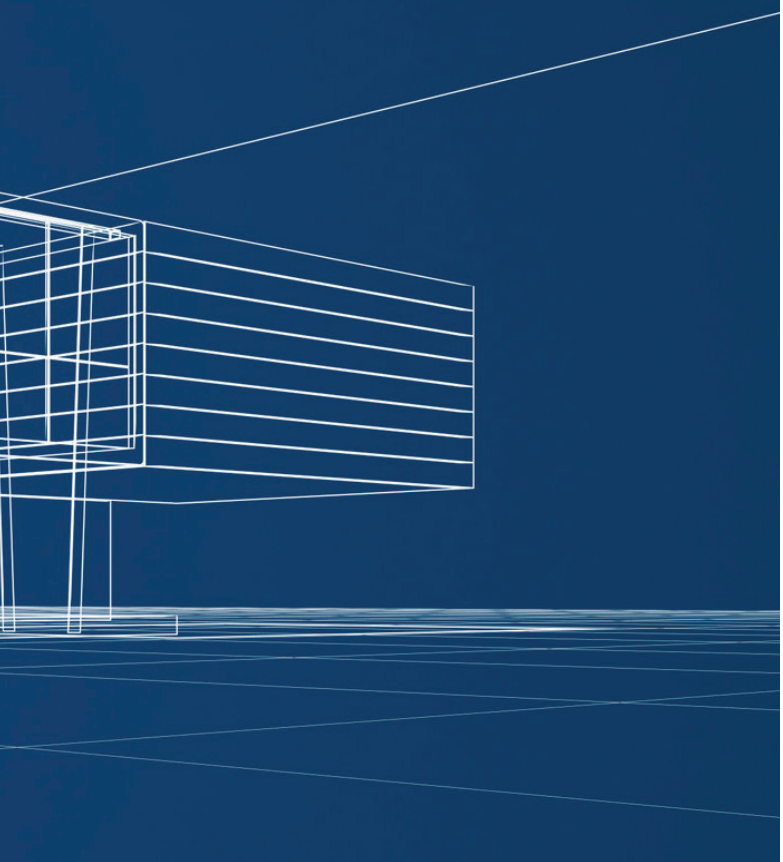
One is fire, though safeguards can be put in place during construction. And, in fact, the burn rate of mass timber components has been shown to be comparable to steel or concrete, with the components tending to char rather than burn completely, Bob Haskell said.

Water damage is a significant risk, according to Sedat Kunt. An unusually rainy season during construction could result in components expanding and cracking and needing to be replaced, he said. Poor workmanship, particularly in the current tight labor market, can be another issue, potentially leading to water damage if pipe connections aren't glued properly, for example, or to fastener failures between mass timber components.

As innovative technologies offer the construction industry opportunities to improve efficiency, quality, and profitability, some changes in thinking will be necessary for companies to take full advantage, according to Bob Haskell. Contractors will have to resolve more details up front and get all the players in the project on the same page with the technology.

"Construction's going to have to get a little more disciplined, a little more settled earlier in the process," said Haskell. "That's part of the culture shift; that's one of the challenges as they move forward with a lot of this technology."





Modular Construction: Cutting Costs and Saving Time by Controlling the Building Environment

Among the hot innovations in construction today is one that's not entirely new: modular construction.

Producing structures in "modules" off-site using the same materials and to the same codes to which they'd be built on-site and then delivering them to the project site for final construction allows the various components of a structure to be built under controlled conditions and finished buildings to be constructed more quickly.

"Prefab construction is not a new concept," said Rob McDonough, managing director and US Construction Practice leader at Marsh. "We've seen prefabricated homes, but now we're seeing modular methods used in vertical construction, and that leads to a whole new set of risks that contractors need to consider."

"If you're trying to do this all out in the field, you have the elements to deal with," said James Boileau, construction segment director at Zurich. However, the controlled environment of the modular building manufacturer offers not only ideal climate conditions but also often the ability to take advantage of tools like robotics and zero-gravity lifting

equipment to assist with assembling the modules, he said. "In many instances, we've seen modularization offering improved quality."

"As you think about controlling your environment and you think about workplace safety, if you can use an off-site facility for part of the fabrication and manufacturing process and you can cut down the actual work hours on the job-site, that can lead to productivity and work-quality increases," said Rob McDonough.

While modular construction can be employed in building a variety of different types of buildings, its use can be particularly significant in structures like hotels or hospitals, buildings that have a number of "cookie-cutter"–type rooms.

A significant factor contributing to the current interest in modular construction is the tight labor market for skilled construction trade workers.

"There's just not enough skilled labor to do the job in many locations in things like pipe fitting, electrical, etc.," said James Boileau. "One good way of getting work done is doing it in a shop. You can engineer out a lot of the risk when you're in a controlled environment."

Contributing to improved quality is the ability to test systems like plumbing and electrical before a module leaves the assembly facility and is trucked to the construction site.

That transportation element is the source of some possible risks associated with modular construction, however, according to Bob Haskell, executive underwriter and product line manager at AXA XL. The first risk is that

there's also a growing shortage of qualified truck drivers.

In addition, the modules must be designed to withstand the various stresses of the trip from the manufacturer to the construction site. "You're going to build these things, and then they're going to bounce on a truck for 300 miles. How many speed bumps can they take?" Haskell said.

Avoiding other modular construction risks requires detailed planning.

"You have to really have it tuned in exactly, because when the module shows up on-site, it has to fit with the other ones," said James Boileau. "There needs to be really good coordination between the manufacturing and the field."

"If you're going to go to this model, you can't afford a hiccup, you can't afford a glitch. Things will pile up right behind any problem you have," said Bob Haskell. "You've got to think things through, you've got to plan things out, you can't defer many things."

Building information modeling and project sequencing technology can help with keeping track of local regulations as modules move across states and with timing of module assembly and delivery, he said.

"You have to spend some money up front and plan—probably excessively plan—before you build your modularized components and install them," said Craig Durgarian, assistant vice president and principal risk engineer at Zurich. "If contractors try to compress this up-front planning because they're concerned about spending the money, they're going to trip up on the back end."

It's also necessary to address the various insurance issues as the module moves from assembly to installation. Among other things, it's essential to specify when possession of the module is transferred, who's responsible for it from point to point, what sort of cargo insurance the truckers are required to carry, and whether the contractor will carry redundant coverage, Bob Haskell said.

There also might be questions about how the law applies to modular construction, such as whether there might be product liability issues if there's a problem with modules. To date, courts have held that the factory work assembling the modules is a provision of service with the factory workers acting as subcontractors, according to Haskell, allowing traditional construction laws to apply.

"Eventually, somebody could decide in a certain case that this is a product. That would put it in a different realm," Haskell said. "We'll find some cases that will go in different directions."

While modular construction demands considerable planning and close attention to detail throughout the building process to be successful, ultimately, the potential benefits are too great to ignore the opportunities the construction process provides. That's especially true given today's narrow construction margins and ever-tighter schedules.

"If you plan properly, I see a tremendous upside," said Zurich's Durgarian. "Companies that don't embrace available technologies to assist are going to be left behind," he said. "Because even if they're awarded the contract, they're likely not going to be able to complete the work in the time allotted. Current digital planning tools to simulate the cradle-to-grave fabrication and installation process are fundamental to success."

Construction Technology: Creating Safer Worksites with a Side Benefit of Productivity

As technology increasingly reshapes construction processes and materials, it's also playing a major role in construction risk management, whether in terms of worker safety or helping contractors meet tight construction deadlines.

"The most successful construction companies have one thing in common: a sharp focus on people and safety," said Rob McDonough, managing director and US construction practice leader at Marsh. "With the rise of devices like fitness trackers, wearables are making their way into construction and hold great promise in helping to create safer work environments."

Multiple types of wearables could find a place on construction sites.

- Positional wearables can identify where a worker is in a construction site, both vertically and horizontally. "That type of wearable is really useful in an emergency," said James Boileau, construction segment director at Zurich. Accelerometers in the wearable can provide an alert in the case of a worker fall, for example, and locate the injured worker in the site. "They help you understand where people are and how they're moving," Boileau said.
- Fatigue monitoring wearables can track data like heart rate, breathing rate, and other information to determine when a worker might be fatigued and at increased risk of accident or injury.
- Proximity warning wearables can alert a worker if they come too close to a hazard such as a live wire.
- Ergonomic wearables can help reduce injuries by guiding employees to undertake tasks like lifting the right way or alerting them when they don't. "They'll provide an alert when someone does something incorrectly," Boileau said. "The wearable device is sensing how a person moves, and the data they provide can be used to make changes to how people are doing things or how often they do them to reduce stresses on the body."

Zurich is doing an internal study to identify the benefits wearables can provide from an understanding and training standpoint, Boileau said. "I can see that very easily crossing over into construction in the near future," he said.

> *"The most successful construction companies have one thing in common: a sharp focus on people and safety."*

Beyond the safety benefits, wearables can also help increase productivity, Boileau said. Positional wearables can help contractors decide where to best position materials to allow workers to work more quickly and efficiently, he said.

"When I think of the positional aspect, in concert with planning and executing project field tasks as detailed as a Swiss watch, so to speak, I think about knowing exactly where your trades are, how that might help with fast-track scheduling constraints and the incredible amount of stress that's being put on contractors and construction managers these days," said Craig Durgarian, assistant vice president and principal risk engineer at Zurich.

"We're not there yet, but I think we're starting to get close to using wearables to make sure you know where your manpower is and that your plan is being executed the right way to build to these tighter and tighter schedules," he said.

Of the potential challenges with wearables, worker acceptance is one of the biggest ones contractors will need to address. "You need to get the workers' buy-in, making sure that they see it as a benefit as well, that it's not that 'Big Brother is watching,'" said Boileau. "How you introduce them, how you utilize them, how you manage them, and mostly how you communicate with workers about them are extremely important."

Exoskeletons essentially are their own type of wearable. These devices are worn to augment the user's ability, allowing the user to lift more, reach higher, or do more without fatigue, for example.

"Some are wearables, but others are robotics," Boileau said. "The robotic is separate, and a person is controlling it. It creates less stress on the body."

"In general, when we talk about wearables, it's mostly about safety and soft tissue injury prevention," he said. "Understanding and reducing the pressures or exposures to a person's body are the main benefits, with the side benefit that it can increase productivity because if a worker is doing something more accurately or is assisted with lifting, they can do more because they're not as tired and can do it more quickly."

"Anything you can do to enhance productivity—such as labor assistance—to make these tighter schedules more achievable, I'm all for it," said Durgarian. "As an example, if we can work on labor assistance for repetitive overhead lifts, above ceiling work, etc., I see that as a benefit if it's managed right, it's studied properly, and, its use is really vetted before you spend the money on the technology."

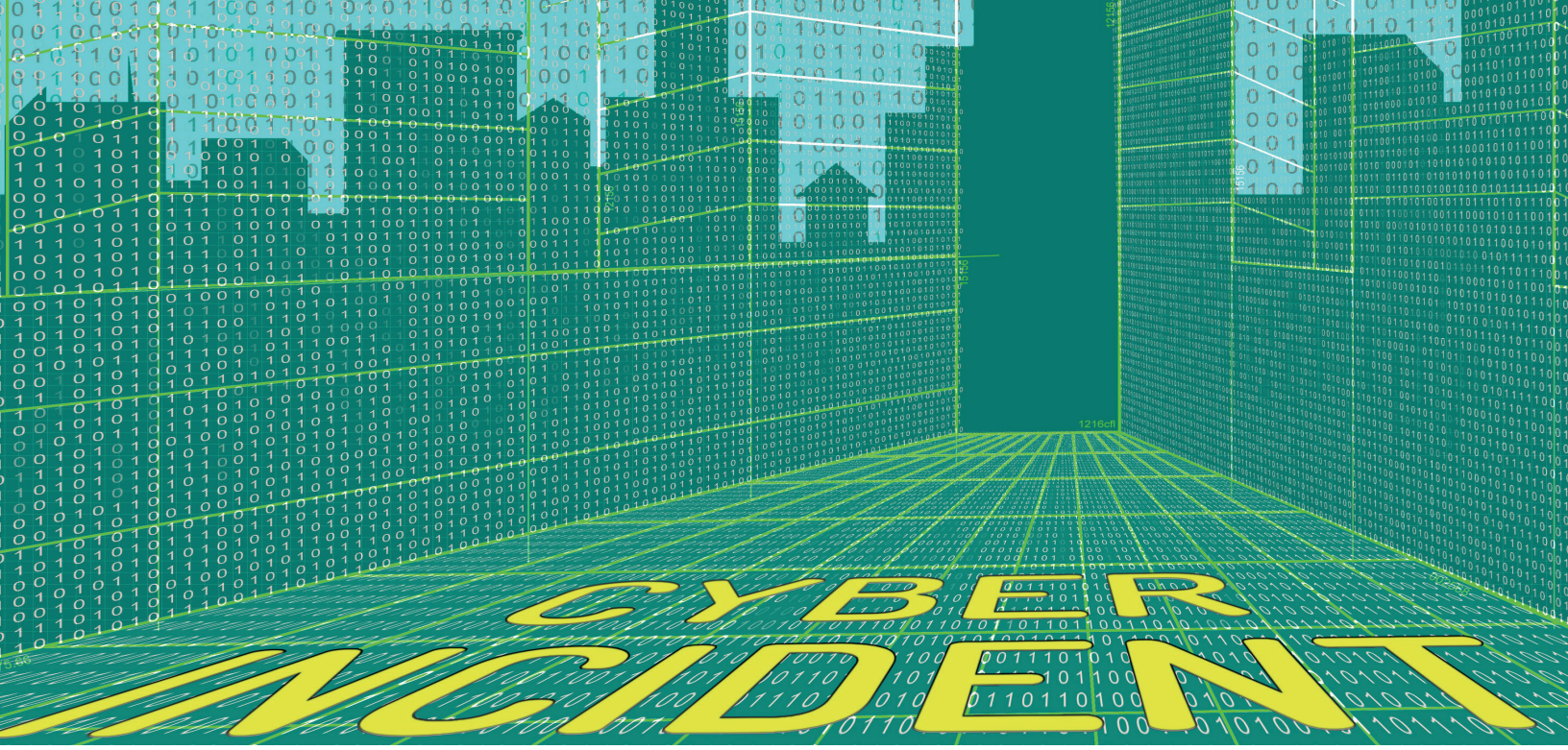
Environmental sensors are another technology that can help create safer construction workplaces. "There are sensors that monitor carbon monoxide, dust particles, noise, light, heat, humidity to alert the project team that there's a particularly hazardous situation going on," said Rose Hoyle, strategic operations manager for Risk Engineering at AXA XL. "Those are really beneficial for keeping workers safe."

"Those things go to your phone—they alert you by text—and it's all very smart," Hoyle said.

Photography and photogrammetry are another area of technology that holds potential to reduce injuries at construction sites.

"There are tech solution companies that take photos and run them through an artificial intelligence platform that identifies risks in the photos so you can remedy the situation," Hoyle said. The technology can scan a floor at the construction site, for example, pick out a worker not wearing gloves, and identify that as a potential risk, she said. "It will identify a human hand and that it's a human hand that's uncovered, and it will send an alert. It's very sophisticated."

Technology keeps advancing at an amazing rate, and, more and more often, it's finding its way into construction. As it does, it seems certain that one of the major benefits will be technology's role in creating safer and more productive construction worksites.



Addressing the Growing Cyber Threat as the Construction Industry Embraces Technology

The construction industry's increasing embrace of technology brings with it a host of potential benefits, including increased efficiency, profitability, and quality. But it also brings a serious new risk to be managed: cyber risk.

"The construction industry can't discount the risks that come with moving to digital operations," said Matt McCabe, senior vice president at Marsh. "Construction is an interesting sector because contractors are so highly interconnected with clients and subcontractors. Like every industry, they are on a fast pace for adopting new IoT technologies, which is advanced by the dawning of 5G networks. Construction companies and their clients are poised to realize a lot of efficiencies, but they have got to keep up with the risk that comes with this evolution of technology."

"Construction historically hasn't been that highly targeted because it doesn't have the high levels of sensitive data that have traditionally attracted hackers. And, while it isn't as connected as some other industries are, the industry is becoming more connected and more vulnerable to cyber risks beyond data breach," said Nikki Ingram, cyber-security risk consultant at Zurich. "And like every other industry, construction is moving to more and more technology at the construction site, the corporate office. All phases of the process now have some form of technology in them."- Construction companies' cyber risks can arise across a variety of areas. Among other things,

construction projects are very collaborative endeavors with constant communications among contractors and subcontractors, communications that can be disrupted by a cyber attack.

And while construction companies might not be collecting the same sort of sensitive data as healthcare systems or payment card companies, "You still have data," Ingram said. A data breach can potentially put data such as employee information, bid information, intellectual property, or information about sensitive projects at risk.

Construction companies involved in such projects have to be conscious of possible vulnerabilities in their supply chains and be aware of the exposures they might face if the technology included in structures includes security vulnerabilities.

"A lot of this is going to come down to the supply chain," McCabe said. "To what degree are contractors and their subcontractors and the subs to those subs agreeing to provide secure technology, and how do you verify those commitments before the breach happens?"

Since the construction industry does not gather large amounts of personally identifiable information, it hasn't previously faced the regulatory pressures applied to some other industries to enhance cyber security, McCabe said. As a result construction companies must accept responsibility at the most senior levels, assess how cyber risks can impact their business and their customers, and take the steps necessary to protect assets and projects.

One factor adding to that motivation is the rise of crippling ransomware attacks. "Cyber is no longer just about data breaches," McCabe said. "There's a greater awareness because of the prevalence of ransomware attacks that can leave any organization sitting still in the water. Ransomware attacks can be debilitating and costly."

> *"Cyber is no longer just about data breaches."*

Avoiding ransomware attacks that can interrupt communications with subcontractors is all about building resilient networks, said McCabe. "It sounds like it's very routine stuff, but make sure critical patches are up to date; educate your workforce," he said.

"Phishing emails are a scourge of cyber security," McCabe said, so companies must educate those with access to systems on the threat and how to avoid being victimized. That training should be tailored to the individual's level of access to the network, said Nikki Ingram.

Companies also should back up data to servers that are off the network and won't be subject to the same attack, Matt McCabe said.

Data encryption can help protect sensitive data. "We all know that cell phones and tablets eventually grow legs and walk," Nikki Ingram said. "You can't prevent bad things from happening, but with encryption, you can reduce the likelihood."

Multifactor identification and vulnerability scanning are other useful cyber-security tools.

Ingram noted that there's no "one-size-fits-all" approach to crafting cyber security. Construction companies should begin with a risk assessment, examining potential risks within their own organizations and the varying levels of risks within subcontractors to guide their security efforts.

"A welding subcontractor might not have any access to your systems," she said. "But another subcontractor, say a general electrician, might be involved in a lot more communications." The contractor should apply the right controls based on the level of risk posed by each subcontractor and have the right methodology in place to assess each new risk as it comes.

Likewise, cyber risks can vary by project and must be assessed and addressed on a case-by-case basis. "It's just general risk management," Ingram said. "A high-profile project might have a different level of threats facing it than a smaller project at a lesser-known site."

Matt McCabe said contractors are definitely beginning to take a closer look at the cyber risks posed by subcontractors, particularly as project owners place greater cyber-security pressure on the contractors.

"Across all industries, including construction, contractual riders about cyber risk are becoming standard," he said. "That includes requiring contractors to buy cyber insurance. Naturally, they're going to pass those requirements down to their subcontractors as well."

As cyber risks facing the construction industry increase, construction companies must manage them the same way they'd manage any other risk.

"Ultimately, whether it's construction or any industry, they need to look at cyber security as another business risk that's included in their enterprise risk management," said Nikki Ingram. "Construction companies always consider risks like weather events, taking into account how excessive rainfall might affect a project. The principles for addressing cyber risk are the same if you simply drop the word 'cyber.'"

"Construction companies should begin with a risk assessment, examining potential risks within their own organizations and the varying levels of risks within subcontractors to guide their cyber-security efforts."

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Talent Shortage Is a Common Denominator Across Many Construction Risks

There's a common theme running through many of the risks facing the construction industry: a tight labor market. Fueled by a construction boom and an aging workforce, talent shortages can have an impact on both the ability to deliver projects on time and the quality of workmanship.

According to the US Bureau of Labor Statistics (BLS), unfilled construction jobs reached a post-Great Recession high of 404,000 in April.

"One of the biggest issues around construction is retaining and attracting the best construction management and skilled labor around projects," said Rob McDonough, managing director and US construction practice leader at Marsh. "That continues to be a headline issue that we're seeing across the country. The reality is this war for talent around construction is very, very real."

"We're in an environment where construction is booming. Nobody knows when it's going to end," said Aldo Fucentese, senior vice president, construction, at Liberty Mutual Specialty. "Everybody's struggling to find good workers and put boots on the ground. This is a common concern from the contractor perspective—where are [they] going to find the people to staff projects."

Among the ways those talent shortages can manifest themselves are increased risks of subcontractor defaults (see related article), the inability to find subcontractors with necessary skills, or poor-quality workmanship. Even shortages of qualified drivers or crane operators can have an impact on the ability to complete projects.

"There are some subcontractors that are very critical to a project. If you're building a data center, the skilled electrical subcontractor is key. If you're building a hospital, you need a good mechanical subcontractor," Fucentese said. "So, what we see, especially in certain parts of the country where construction is hot, is it's very hard for the general contractors to find the subs that can execute a complex job. That puts a strain on projects."

In an emerging area of construction like composite wood systems, where water damage can be a major risk, poor workmanship is a major concern, said Sedat Kunt, managing director at Marsh.

He cited the experience of one client's use of cross-laminated timber in a project in which the producer of the cross-laminated timber components addressed the issue by sending its own workers to the construction site to fasten the components. "That doesn't happen on every project," Kunt said.

"There are definitely some types of construction that suffer more from poor quality," Fucentese said. "And when you look in certain parts of the country and the labor market is extremely tight, quality is definitely an issue."

On many larger projects like large hotels or stadiums, contractors are looking to technology to address the quality issue, using virtual design and construction to create detailed project models before construction begins.

The labor shortage is also leading contractors to scrutinize the workers their subcontractors are assigning to their projects more closely. It becomes important for contractors to ensure that their subs are assigning their "A team" to the project—"people you know and have worked with in the past," McDonough said.

"The contractors that are most successful do tend to work in parts of the country where they have very close relationships with the subcontractors and know them very well," Fucentese said. "It's not a very good risk attribute for us when a general contractor is starting operations in a completely new part of the country. Because if you don't know the subs, it's going to be a challenge to execute, both on the timeliness and also on the quality."

Going forward, the construction industry needs to find ways to attract and train more skilled labor. As bad as the labor shortage is today, the BLS estimates that the construction industry will need 747,000 more workers by 2026.

"There is a need for more skilled labor entering construction," Marsh's McDonough said. "As an industry, we need to train and grow from within because we have an aging workforce. So, as we think of construction 10 or 15 years from now, it's very relevant to think about developing more skilled workers."

Part of the task is finding ways to appeal to the next generation of workers.

"Construction doesn't have the appeal to younger generations," said Rose Hoyle, strategic operations manager for Risk Engineering at AXA XL. "Meanwhile, skilled construction workers are aging out, and we don't have anyone to backfill that talent, or the trade schools to train them."

Around the country, there are efforts to encourage young people to consider apprenticeships in construction trades. An emphasis on the growing role of technology in construction might also provide an attraction for many young workers.

In any case, talent is proving to be a critical risk for the construction industry and one the industry must address to take best advantage of the opportunities of the future.

Strong Economy, Hot Labor Market Heighten Construction Companies' Subcontractor Risks

Ongoing economic strength that's fueled a boom in construction projects has a more challenging flip side for construction companies: high demand and a tight labor market that can affect subcontractors' ability to meet commitments.

Tight labor markets can sometimes make it difficult for subcontractors to complete work on schedule or at an expected level of quality. For the subcontractors or general contractors employing them, that can result in lost time, added costs, potential litigation, and unhappy project owners.

In the current climate, reducing the chances of subcontractor failures and defaults is critical, as are taking steps to protect against any losses that might result from defaults that do occur.

"When the economy is better, ironically, we see more subcontractor defaults than when the economy's struggling," said Rose Hoyle, strategic operations manager for Risk Engineering at AXA XL.

The reason for the increase is twofold, according to Hoyle.

"When the economy is poor and construction is slow, subcontractors tend to be more focused on the quality of their work and their performance in order to position themselves to win the next project. They tend to be less concerned when construction is booming and they know they can secure their next job without much difficulty," Hoyle said. "It may sound counterintuitive, but we see more sub defaults when the economy is climbing than when it's declining."

A tight labor market compounds the issue.

"We are seeing a lot of defaults now driven by the labor shortage," Hoyle said. "In a strong economy, suncontractors get excited about

all the job opportunities and they overcommit themselves to more work than they can realistically handle. They realize this once they begin performing on the jobsite and their labor force becomes more stretched. This is when they end up walking off one or more jobs, and if they have to choose between an [subcontractor default insurance] SDI project and a bonded project, they'll protect their bond every time. So we see an increase in SDI defaults."

"Arguably subcontractor failure poses the single largest risk to a project being able to be completed successfully," said Douglas Schrift, chief underwriting officer, SDI at Liberty Mutual Surety. "It's a heightened issue for general contractors. It impacts all the stakeholders, and there's been a growing demand for performance solutions."

One way construction companies are responding is by ratcheting up their subcontractor prequalification processes, according to David S. Hewett, managing director and US surety leader at Marsh.

"One of the things that we're seeing construction companies deal with more and more is their own improvement around subcontractor prequalification," Hewett said. "We're seeing them improve their systems; we're seeing them spend more time prequalifying subcontractors. And no small part of that is their concern around subcontractor performance right now."

"Sub defaults are infrequent compared to some of the other issues out there, but when they happen, they are extremely significant," said Schrift.

General contractors are experiencing subcontractor labor issues in many areas of the country, Hewett said, and while they can use surety bonds or SDI to help protect themselves, they're also interested in ensuring that their in-house process for prequalifying subcontractors is as solid as possible.

Those heightened prequalification efforts follow two tracks: financial review and operational review.

Hewett said he's seen many contractors dig more deeply on their financial review of subcontractors, asking more questions and seeking more detailed information.

On the operational side, contractors are seeking much more specific information from potential subcontractors about the teams that will be working on the job and their access to the supplies needed to complete the project. When materials such as steel, glass, and others are involved, they're also seeking much greater details about the companies providing

those materials and about other obligations those companies or even the specific plants providing the materials might have to other projects.

"The top firms are definitely past the stage of saying, `Here's the specifications, send me a bid, and I'll take the low bidder,'" Hewett said. "They are getting much more in-depth with their subcontractors, going beyond just taking a low bid and maybe taking a bond or placing an SDI policy."

"They're also making sure their subcontractors can perform," he said, "much more so than they ever have before, in no small part because of their concerns about the labor shortage's effects on subcontractors' ability to complete the job."

Besides the direct benefit of helping ensure that subcontractors can successfully complete the job, the heightened prequalification efforts can have other benefits for subcontractors, according to Hewett.

One is in providing greater confidence and comfort to surety bond underwriters. The companies with better subcontractor prequalification processes tend to experience less volatility in income and performance and more predictable profits on projects.

"That consistency in profitability gives surety underwriters more confidence in that contractor's operations," Hewett said. "They see the steadiness of income, they see the steadiness of performance, and that steadiness of performance gives surety underwriters confidence to give more credit than they might give to another firm."

On time-sensitive commercial construction projects, general contractors that have ramped up subcontractor prequalification processes to improve subcontractor performance are seeing those efforts translate into repeat business from project owners. "By being able to perform in areas that may have difficult labor shortages, they're able to get more work from the owners," Hewett said. "The contractors that are meeting the time frames and delivering the projects on schedule with good product are the ones that get brought back."

Hewett said subcontractors are pushing back somewhat on construction firms' more stringent prequalification processes, but they are generally complying.

As contractors develop more rigorous subcontractor prequalification processes, there's a desire to automate the process, Hewett said, but, as yet, an industry-leading solution for doing so hasn't emerged.

Another major way construction companies are looking to protect themselves from subcontractor default risks is through SDI.

"Most of the larger contractors, the ENR 400s [Engineering News-Record Top 400 Contractors], are doing a lot with SDI," said Hoyle. But, she noted, the coverage is a boutique-type product that typically is only available to a certain caliber of contractor.

"You have to have a really good prequalification process and a really good quality process in order to be eligible for an SDI program," she said. "It's about how the general contractor manages quality, how they manage the trade workers. We also look at how they've managed defaults in the past, because when a default occurs, how the contractor manages that often dictates how big the loss is."

"Through the underwriting process you're looking for contractors who have a good history of managing risk," said Liberty's Schrift.

Hoyle noted that SDI is a very different product from a surety bond, typically with a very high retention. "Many SDI policies have high deductibles that start in the millions," She said. "So the contractors take on a huge part of the risk."

Most construction companies using SDI have done so for several years, Hoyle said, but those new to the product typically work with a consultant to get their processes in order before approaching the market.

Over the last several years, construction companies have increasingly looked to SDI coverage, Hoyle said. "It's a pretty sophisticated product, and the benefits outweigh that of surety in many ways," she said.

Among other things, while a surety bond will only cover the amount of the contract, the limits of an SDI policy can go beyond the contract value. "Most defaults cost from 1.5 up to 3 or 4 times the amount of the original contract," Hoyle said. "So, if you have a $1 million contract and a subcontractor defaults, chances are it's going to cost you another $1 million, maybe $2 million to fix it."

Another major factor is that SDI allows the contractor to determine how to address the default. While a surety bond provider might dictate terms to the contractor on how they should address the default, SDI leaves control for determining how to resolve the issue with the contractor. "It places the control in the hands of the party best suited to address it: the contractor," Hoyle said.

"If a subcontractor defaults, an SDI policy gives the general contractor unilateral control over how to complete the scope of work," Schrift said. "That helps them in many ways to complete the project. The intent is to not cause delays in the project cycle."

Whether it's through improved subcontractor prequalification processes or insurance products like SDI, there are steps construction companies can take to protect themselves from risks associated with subcontractor defaults. In the current hot construction and tight labor markets, contractors that most effectively take the steps needed to reduce subcontractor risks will be those best positioned for success.

> *"Arguably subcontractor failure poses the single largest risk to a project being able to be completed successfully."*

As Auto Liability Risks Grow, Construction Companies Focus on Fleet Safety

Auto liability risks continue to increase for construction companies, with such factors as distracted driving, a tight labor market, and ever-larger jury verdicts in accident cases heightening the exposure.

The rising risk makes it essential that contractors do all they can to manage auto liability risk and emphasize fleet safety. That includes creating and applying effective vehicle safety standards, thoroughly screening and continuously monitoring drivers, and taking advantage of some of the technology tools entering the market.

"The construction industry's auto liability risk is very similar to other industries that have vehicles on the roadways," said Richard Bleser, fleet safety practice leader at Marsh Risk Consulting.

In the past, the construction industry was somewhat sheltered," Bleser said. "There wasn't a whole lot of emphasis from an insurance carrier to make sure that a construction company's fleet safety program was top notch," he said. "Today, that's very evident."

"Fleet safety is certainly getting the attention of contractor leadership," said Ken Wengert, second vice president of construction risk control at Travelers. "It all gets back to the key tenant of fleet safety, which is, who's driving?"

Today, construction companies that previously may not have had fleet safety programs are putting increased emphasis on the issue and on managing the risk.

> *Larger jury verdicts in vehicle accidents add to the auto liability risk.*

As it has across other areas of the construction industry, a tight labor market is having a significant impact on fleet safety efforts. "I think driving is like any other skill that contractors are looking for," Wengert said. "Having less experienced workers on the jobsite can have an impact on losses."

"Finding good qualified vehicle operators is getting tougher and tougher," said Richard Bleser. Compounding the issue is that many of those driving vehicles on behalf of construction companies do not view themselves as professional drivers. "They are skilled workers," Bleser said. "The vehicle is a tool to get them to and from the jobsite."

Ken Wengert said he thinks that, in the past, construction companies were less likely to evaluate those who may be taking the wheel unless they were being hired as professional drivers. "If you were a carpenter or a plumber, it was more about your qualities as a tradesperson, not your ability as a driver," he said. "But ultimately, it's about who you're giving the keys to, even if they're driving their own vehicle but you're providing a stipend or a gas card."

Electronic devices are contributing to distracted driving and are another factor significantly increasing auto liability risk. "Distracted driving is at an all-time high, and it's only getting worse," Richard Bleser said.

"Distracted driving does seem to be increasing," said Ken Wengert. "Addressing it starts with recognizing that there is a concern." He noted that this year's Travelers Risk Index found that 19 percent of construction business executives surveyed said they had an employee get into a collision while driving for work purposes due to distracted driving, while 54 percent indicated that their company worries some or a great deal about its liability should one of its employees be in a crash or collision while driving for work purposes because of distracted driving.

> *One of the elements that we're seeing a lot of organizations adopt is continuous motor vehicle record monitoring.*

Larger jury verdicts in vehicle accidents add to the auto liability risk. "The plaintiffs' attorneys have become very crafty at pursing companies that have fleets," said Richard Bleser. While verdicts in the millions of dollars used to be considered high, today there are verdicts in the hundreds of millions, he said. "The 'nuclear' verdicts are really driving a lot of what's happening out there," he said.

In managing the risks, the first step for construction companies is screening drivers, evaluating their safety records and qualifications, and ensuring that they meet the company's standards and are appropriately licensed for the vehicles they're operating. The evaluation doesn't stop at hiring. "One of the elements that we're seeing a lot of organizations adopt is continuous motor vehicle record monitoring," Bleser said.

Beyond selecting qualified drivers, it's essential that contractors draft policies and procedures related to vehicle operation and coach employees on those expected behaviors on a year-round basis. "You don't want it to be the flavor of the month," Ken Wengert said. "It's like any other safety-related element." Safe driving must become part of the company's overall safety culture.

Various advanced technology solutions help construction companies monitor driver performance and improve fleet safety. Richard Bleser noted technology with driver- and forward-facing cameras that can be triggered by an event like sudden braking to capture images of the driver and the view through the windshield.

The addition of artificial intelligence can also recognize the driver's normal appearance while driving and identify when the driver is engaged in an activity like looking down at a text and provide an audible warning. Other applications can read road signs and gauge following distances, providing warnings to the driver if needed. "It's the best of all worlds because it's giving immediate feedback to the driver while capturing the information and sending it to the safety director," Bleser said.

> *"Finding good qualified vehicle operators is getting tougher and tougher."*

"The biggest challenge for a risk manager in the past is how do you manage that lone worker," he said. "These new technologies are really helping us identify who are the best drivers and who are the drivers in need of additional training and/or behavioral change." The technology tools also help reinforce safe driving practices.

Ken Wengert noted that many companies are increasingly using telematic devices to better manage their fleets. "Just like any other data, it can be very useful," he said. But, if companies are collecting driver data, "it's really important that companies recognize there's a responsibility to use it." Failing to act on data about unsafe driving could put a company at a greater risk if an accident occurs.

For construction companies looking to reduce auto liability risks and increase fleet safety, while the challenge may be significant, the solution is fairly straightforward. "You want to make sure that you have the right people driving the vehicles and that they're following your policies and procedures," Wengert said.

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Celebrating 20 Years of Construction Risk Management Innovation and Thought Leadership

At the 19th IRMI Construction Risk Conference in 1999, the first IRMI Construction Risk Management Best Practices Award—now known as the **Gary E. Bird Horizon Award**—was presented to Gayle Jones of Snyder Langston and George Bragg of Bragg Crane Services for their development of a highly effective crane safety program.

Every year since, IRMI has honored construction risk management trailblazers involved in the development of a technique, process, or program that is innovative and effective. In 2018, a second award—the **Bill McIntyre Leadership Award**—was added to recognize visionary leadership in support of construction risk management.

The awards program is sponsored by Travelers and reflects the company's commitment to helping contractors create a culture of safety and manage their cost of risk. By shining a spotlight on these thought-leaders and innovators, IRMI and Travelers hope to inspire and motivate construction risk and insurance professionals to strive for continuous improvement and share their expertise with others to help move the industry forward.

The 2019 Gary E. Bird Horizon Award was presented at the 39th IRMIConstruction Risk Conference (CRC) to Dan Saddler of Structure Tone Southwest for its innovative behavior-based safety program.

Gary E. Bird Horizon Award

This award program was established to promote the awareness of innovative techniques, processes, and programs that are effective in construction risk management. The identification and communication of these best practices are intended to inspire others in the risk management community to review, develop, and continually improve their own best practices. By highlighting innovative programs that prove effective we also hope that other companies will emulate these practices to improve their risk management for the betterment of all.

In 2002, the award was renamed in honor of Gary Bird, who tragically died on September 11, 2001 along with many friends and colleagues. Mr. Bird was the director of risk management for Phelps Dodge Corporation for 12 years, the original author of ***The Wrap-Up Guide*** published by IRMI, and a forward-thinking and respected member of the construction risk management community. An avid horseman, he felt claustrophobic in big cities because he "needed to see the horizon."

Dan Saddler, vice president of safety for Structure Tone Southwest, received the 2019 Gary E. Bird Horizon Award for his winning submission, "Enhancing the Behavior-Based Safety Process," which detailed the revitalization of his organization's behavior-based safety program.

Over the past 2 decades, the award has recognized an impressive array of cutting-edge risk management programs, including safety initiatives, employee wellness strategies, and enterprise risk management tactics.

This Year's Horizon Award Finalists

Three outstanding finalists were on the short list for this year's Horizon Award.

- Lois Hamilton, safety and operations coordinator on behalf of TEXO Association
- Scott Root, project director, The Kapture Group, Kitchell
- Dan Saddler, vice president, safety, Structure Tone Southwest, LLC

The 2019 award was presented to David B. Dolnick, president of Dolnick Risk Advisors, honoring him for more than 30 years of advocating for safety, quality, and risk management in the construction industry.

Bill McIntyre Leadership Award

This award recognizes visionary leaders who demonstrate commitment to construction risk management through creativity, service, mentoring, and education. It is named for IRMI Executive Chairman Bill McIntyre, who has inspired, trained, and educated thousands of risk professionals and is a passionate advocate of construction risk management and safety. Leaders from all areas of construction risk management, including construction insurance, surety, risk finance, and construction or insurance law, are eligible.

David B. Dolnick, president of Dolnick Risk Advisors, was honored as the recipient of the 2019 award. Mr. Dolnick has been involved in construction risk management for more than 30 years and has received many accolades and awards, including the Risk and Insurance Management Society, Inc. (RIMS), Heart of RIMS Award; RIMS Risk Professional of the Year—San Diego Chapter; and the IRMI Words of Wisdom Award.

Submit a Nomination

The continued strength of these awards programs depends on the participation of the construction risk management community. If your company or clients have eligible programs or individuals that deserve recognition, we encourage you to submit a nomination packet. Nominations for 2020 awards are due in August. Visit IRMI.com/CRC for more information.

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