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As this issue goes to press, I doubt that “Delta” is anyone’s favorite word. Mainly due to the so-named variant of the coronavirus, the Centers for Disease Control and Prevention (CDC) once again has recommended that everyone, including those who are vaccinated, wear masks indoors. The CDC cited new evidence that vaccinated people are as likely to spread this highly contagious variant as those who are not vaccinated, although those who are vaccinated are less likely to become very sick or need hospitalization. Accordingly, I’ve started wearing a mask again, if for no other reason than to protect the lives of children too young to be vaccinated, including my seven-year-old grandson.

After over 18 months of dealing with the pandemic, Delta feels like a real hit to the gut. The scaffold and access industry, however, has proven that it will take this all in stride and persevere. After six years of serving as editor of this magazine and learning from the authors and readers, I believe that’s because the industry is accustomed to dealing with obstacles to safety day in and day out.

Once again, this issue of the magazine reflects the innovation and careful thought and engineering needed to keep workers – and others – safe. In the case of the Scaffold & Access Industry Association (SAIA) 2020 Innovation Award recipient, the Trekker Group had to concern itself not only with the safety of people but also of animals when erecting an underwater scaffold. The cover story, “Supporting the Space Program: One Scaffold Leg at a Time,” describes the unique challenges that Scaffolding Solutions faced in providing safe access.

I hope you will take the time to read this issue from cover to cover. Every article comes from people working in the industry who have given of their time and effort to provide valuable information to our readers. As always, many, many thanks to all the contributing authors.

And many thanks to you, our readers! Please don’t hesitate to contact me with your article ideas and comments. Stay safe!
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Our industry is constantly evolving, and your expertise and leadership are needed! The Scaffold & Access Industry Association (SAIA) is looking for volunteers to become involved in our councils and committees.

SAIA Councils each represent a niche in the industry. They are responsible for the development and implementation of affairs consistent with the product and/or service applicable to each council. All 12 councils currently need volunteers.

SAIA Committees are responsible for the development and implementation of association resources and projects as they arise. The A11 committee is especially in need of members with expertise in testing and rating of scaffolding, shoring, and forming products. Although the committees are closed groups, all SAIA members are invited to indicate their interest in serving on these committees.

**Benefits of Giving Back**
The work of the councils and committees is essential to the association’s work to identify and promote best safety practices in the industry. Your service will help the SAIA to provide industry guidance that is relevant and practical.

Based on my own experience as a volunteer for the SAIA, I believe that you will benefit, too. As a volunteer, you will build or expand your network of friends and colleagues who are willing to share their knowledge and experience with you. Your participation will help to keep you in touch with the latest trends and thinking in the industry.

You can read more about the councils and committee on the SAIA website. The SAIA meetings also provide excellent opportunities to talk to current council and committee members and learn more about their activities.

**Learn More in Person**
The next opportunity to visit with these volunteers is at the SAIA 2021 Annual Convention & Exposition August 29-September 2 in Cleveland. I hope to see you there – please don’t hesitate to stop and visit with me.

Be sure to save the date for the SAIA 2021 Committee Week, which will be held May 1-5 in Memphis, Tennessee. Also mark your calendar for the 2021 A92 Main Committee Annual Meeting, October 3-5 at Planet Hollywood in Las Vegas, Nevada, and the 2022 World of Concrete, January 17-20 at the Las Vegas Convention Center. The SAIA will be there; we will host a members’ reception and offer Competent Person Training. Visit the SAIA website to register for these World of Concrete events.

My sincere thanks to every member who sacrifices their time and energy to the association, and I strongly encourage others to get involved. Your participation will make a positive difference.

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A DIFFERENT LIST

By David H. Glabe, P.E.

Each year the U.S. federal Occupational Safety & Health Administration (OSHA) publishes a list of the “Top 10 Most Frequently Cited Standards.” There hasn’t been a recent year when scaffolding was not included in the list. For the last fiscal year, scaffolding was number 4. Some years scaffolding has been listed several times in the same list, but never in recent history has there been a year when scaffolding was not included.

Frankly, the list can be quite misleading. To the lay person, the list would verify the lax compliance in the construction industry, which is probably accurate. But there is something else going on, in my opinion, that is masked by the infamous top 10. Most citations are based on the easily seen violations. Let’s face it—it is easily observable to see when a guardrail is missing, but it’s a much more complicated procedure to determine if a scaffold complies with the safety factor regulation. Because of this, there is another list that exists but is never seen. It is a list that includes the “The Regulations Most Violated But Never Cited.” Admittedly, this mysterious list is only based on anecdotal evidence and a subjective analysis of 48 years of scaffold observations, but here it is anyway:

1) 29 CFR 1926.451(a)(1)
2) 29 CFR 1926.451(a)(6)
3) 29 CFR 1926.451(f)(1)
4) 29 CFR 1926.451(f)(3)
5) 29 CFR 1926.451(f)(7)
6) 29 CFR 1926.451(g)(4)(vii)
7) 29 CFR 1926.454(a)
8) 29 CFR 1926.454(b)

Before reading any further, do you know the hazard each of the listed regulations address? If not, grab your personal copy of the OSHA regulations, and follow along.

29 CFR 1926.451(a)(1). This regulation specifies that all scaffolds must support their own weight and 4 times the applied load. To comply with this regulation, the scaffold user must know the capacity of the scaffold being used, information that will come from the manufacturer of the scaffold being used. Unfortunately, many scaffold erectors and users have no idea who the manufacturer is nor do they care. The user must also know how much the stuff they are placing on the scaffold weighs. It is common that the users have no idea. Luckily for them, the compliance officer doesn’t ask those questions nor is the compliance officer trained in how to evaluate the information. Consequently, this regulation is rarely cited.

29 CFR 1926.451(a)(6). This regulation requires that all scaffolds be designed by a qualified person and that the scaffold must be built according to that design. A qualified person is an individual who knows stuff. OSHA has a long definition that includes the well-stated requirement that a qualified person is “An individual who has successfully demonstrated his/her ability to solve or resolve the problems related to the subject matter, the work, or the project.” In other words, the qualified person must know the capacity of the scaffold, how bracing works, when ties are required, how much load you can place on the platform, the rigging, and the strength of the foundation, just to mention a few criteria. Enforcement of this regulation requires the compliance officer to determine if the qualified person is indeed qualified. This means that in order to determine if another person is a qualified person, the compliance officer must be a qualified person. Most compliance officers never receive sufficient training to reach that level of knowledge. Consequently, this regulation is never cited. Note also that the scaffold must be built according to the qualified person’s design. This can be tough to enforce since many, if not most, scaffolds have no paper or electronic documentation of the design. And, as experience indicates, erectors seem to misunderstand that erecting the scaffold in compliance with the design is not a suggestion but rather an actual OSHA requirement.

29 CFR 1926.451(f)(1). This regulation requires that the scaffold not be overloaded, that is “not loaded in excess of its maximum intended loads or rated capacities, whichever is less.” Reference the earlier discussion regarding the safety factor. The same argument holds true here. You must know the scaffold capacity and the weight of the stuff on the scaffold. A compliance officer needs this information to enforce the regulation, that is issue a citation. Experience shows that compliance officers do not ask for this information. Imagine what might happen if they started asking for it.

29 CFR 1926.451(f)(3). The requirement here is that every scaffold must be inspected by a competent person prior to each work shift. By definition, a competent person must be able to recognize hazards and have the authority to do something about it. The authority part is normally given to the foreman or supervisor; it is the first part that is a tough hurdle for most scaffold users. The supposed competent person typically cannot recognize all the scaffold hazards. Similar to the qualified person conundrum, to determine if a person is a competent person, you yourself must be able to recognize hazards. If you cannot recognize hazards, how would it ever be possible to ascertain if another individual is recognizing all the hazards? If your job is to enforce this regulation, you must know the hazards.

Never in recent history has there been a year when scaffolding was not included in OSHA’s "Top 10 Most Frequently Cited Standards" list.

Have a technical question for SA Magazine you’d like to see answered here? Let us know! Send an email to dhg@glabeconsulting.com with your question.
29 CFR 1926.451(f)(7). Here, the regulation specifies that all scaffolds shall be erected only by trained and experienced workers selected and supervised by a competent person. Again, the compliance officer must be knowledgeable about scaffolding to be able to determine compliance with this regulation. Except for the most obvious and egregious examples, the average compliance officer, as well as many scaffold erectors, lack the training to be “experienced.” This is evidenced by the poorly constructed scaffolds that are frequently seen on job sites that should be cited but never are.

29 CFR 1926.451(g)(4)(vii). All guardrails on supported scaffolds are required to support 200 pounds in any downward or horizontal direction, as required by this regulation. While it is reasonable to rely on the responsible scaffold manufacturer to provide an adequate rail, what happens when the rail is wired on the post or a wood two-by-four is used? To comply with this regulation, the erector/user must be able to determine the strength of the connection and the rail. For example, the erector would need to know what strength lumber is required. The compliance officer would need to know that also to determine if a citation is warranted.

29 CFR 1926.454(a). Here, the regulation requires that all scaffold users are to be trained by a person “qualified in the subject matter.” Among other things, the training shall include “the proper use of the scaffold, the maximum intended load and the load-carrying capacities of the scaffold used.” This reiterates the theme of the other violated regulations in that users rarely know the capacity. This is due to fact that the supposed qualified trainer does not know the information, cannot convey it to the user, and therefore cannot meet the requirements of the regulation, resulting in a failure to meet the requirements of the regulation. Since the compliance officer is rarely qualified to verify the trainer’s qualifications, this regulation is ignored except in the most noticeable cases.

29 CFR 1926.454(b). Erectors and inspectors are to be trained “to recognize any hazards associated with the work in question.” This includes “the nature of scaffold hazards, the design criteria, maximum intended load-carrying capacity and the intended use of the scaffold.” Since the inspection of a scaffold must be accomplished by a competent person, inspectors are required to be knowledgeable about the OSHA regulations. OSHA clarified this requirement in the scaffold preamble by stating that a competent person “must have had specific training and be knowledgeable about the structural integrity of scaffolds and the degree of maintenance needed to maintain them. The competent person must also be able to evaluate the effects of occurrences that could damage a scaffold. In addition, the competent person must be knowledgeable about the requirements of this scaffold standard. A competent person must have training or knowledge in these areas in order to identify and correct hazards encountered in scaffold work.”

Anecdotal evidence indicates that few scaffold inspectors have a knowledge of the scaffold structural integrity and the pertinent regulations. Interestingly, the OSHA scaffold regulations were promulgated to address hazards in the erection and use of scaffolding. It is ironic that the current practice of compliance and enforcement has not produced the expected outcome.

**About the Author**
David H. Glabe, P.E., is President of Glabe Consulting Services Inc. and Founder of DH Glabe and Associates. Contact him at dhg@glabeconsulting.com.
With the prevalence of cyber-attacks in the news this year, cyber risk management has become increasingly salient for all businesses, and rightfully so. Major events involving Microsoft Exchange, CNA Insurance, the Colonial Pipeline, and information technology (IT) infrastructure providers SolarWinds and Kaseya have shown that vulnerability exists throughout the system and that issues at one company can often migrate to others through interconnected networks. With so much of construction businesses’ project management and payments running through online channels, it is important to invest the time and resources to ensure that basic cybersecurity safeguards are in place. According to the IBM Cost of Data Breach Report, the average total cost of a data breach in 2020 was $3.86 million. This article reviews the reasons that cybersecurity is important, ways your organization can be targeted, and a variety of risk management strategies.

Importance of Cybersecurity
Many businesses, especially small and mid-sized operations, underestimate their value as a cyber target. At the same time, businesses often overestimate the amount of effort required from hackers to breach their system. These twin misperceptions lead companies to underinvest in cybersecurity. Scaffolding companies are routinely involved in projects that have information flowing back and forth between partners, subcontractors, and suppliers, creating opportunities for malware to infiltrate one party and then spread to others. Activities that scaffolding businesses conduct digitally can be targets for cyber criminals. For instance, construction businesses make and receive large lump-sum payments that have been targeted for fraud or manipulation. Ransomware can target software-based systems that contractors use to track projects, inventories, and resources. Finally, like all businesses, scaffolding companies hold confidential information and employee data that has black market value.

A cybersecurity incident can lead to monetary theft, downtime, breach of intellectual property, compromised bid data, customer loss, and reputational damage. Significant attacks within the construction industry include a 2019 cyberattack when Bird Construction became a victim of Maze ransomware, and hackers demanded millions in exchange for a decryption key. In 2020 Bouygues Construction became a victim of a Maze ransomware cyberattack, which led the company to temporarily shutdown its computer systems. Allegedly, the cyberattack included posting of confidential information on a public website. Six-figure attacks targeting payments and computer systems occur virtually every day.

Ways Your Company Can Be Targeted
While some of the most prominent examples in the news relate to espionage or disruptive activity from foreign actors, the most common purpose of cyberattacks is crime for profit. Hackers have a number of tools they can use to steal directly from organizations, to defraud employees, or to extort. Common examples of cyberattacks include the following:

- **Ransomware** is a form of cyber extortion. The attacker gets the unaware victim to install malware encrypting the victim’s files. The attacker demands a ransom from the victim to restore access to the files upon payment.

- **Social engineering fraud** entails a cyber criminal misleading an employee into sending money or diverting a payment based on fraudulent information provided to the employee. These can happen even when only one person is responsible for all accounting matters. For example, a hacker can access a system and send emails to customers with legitimate or fake invoices and ask for payment to a different bank. The email can come from the actual employee’s email address and can be challenging to detect.

- **Phishing** is when employees or stakeholders receive fraudulent communications that appear to come from reputable sources, usually through email. The objective
is to steal sensitive data such as credit card and login information or to install malware. Phishing is an increasingly common cyber threat. According to CSO Online, phishing attacks account for more than 80% of reported security incidents.

• **Denial of service** involves cyber criminals making a machine or network unavailable by disrupting services. Denial of service is typically achieved by overflowing the targeted resource with unwanted requests that overload systems, thus preventing legitimate requests from being fulfilled.

• **Password attacks** include various methods intended to maliciously authenticate into password-protected accounts. These attacks are typically facilitated with software that accelerates guessing passwords.

**Risk Management Best Practices**

With cyberattack activity growing, it is important to get the basics right. If working with an internal or external IT specialist, make sure to understand what security measures are in place and that the IT specialist is staying on top of emerging risks. Some universal best practices that can help reduce the likelihood of attacks and prepare your organization if an attack should happen are:

• **Educate employees.** Train employees in cybersecurity principles. According to Cybint, 95% of cybersecurity breaches are caused by human error. Additionally, educate employees about the importance of reporting suspicious activity right away.

• **Run updates.** Install, use, and regularly update antivirus and antispyware software on every device. Download and install software updates for operating systems and applications whenever available.

• **Back up information.** Make safe backup copies of important business data and information on regular schedules.

• **Protect internet connections.** Secure your Wi-Fi networks and deploy firewalls. Have IT periodically “test” the security.

• **Limit access.** Control physical access to computers and network components. Limit employee access to data and information, and limit authority to install software. Require individual user accounts for each employee.

• **Enable multifactor authentication.** Require multifactor authentication for email and critical systems.

• **Establish controls on electronic payments.** Get oral verification of all wire or ACH instructions from a known person or by calling a publicly available number for the vendor. If processing a request from an internal person, get oral confirmation from that person and the internal approver/signer before starting payment.

• **Enforce strict password protocols.** Ensure all individuals in the organizational environment regularly change their passwords on all systems and email. Make
sure different passwords are used for different accounts and that the passwords are sufficiently complex to make them difficult to hack.

• **Conduct penetration tests.** Penetration tests can help organizations review the effectiveness of cybersecurity measures. These tests identify the most likely avenues for a cyberattack and help organizations better understand potential weaknesses. These should be done on an annual basis and whenever a new system is added.

• **Enact a Cyber Incident Response Plan:** A Cyber Incident Response Plan can provide clear steps for companies to follow when a cyber event occurs. These plans include a set of instructions designed to help companies prepare for, detect, respond to, and recover from network security incidents.

• **Secure cyber liability insurance:** These policies help cover data breaches, intellectual property rights, damages to a third-party system, system failure, cyber extortion, and business interruptions. They can protect businesses against significant financial losses. The unfortunate reality is that criminals are trying to break into organizations every day, and in essence everyone is vulnerable. By understanding your company’s cybersecurity threats and taking basic steps to control your risks, you can reduce the likelihood of a successful attack. By adding a cybersecurity response plan and securing cyber liability insurance, you can be prepared in case an attack does occur. By elevating your cyber risk management strategies, your clients and partners will view your organization as a more reliable partner. In the same way, you can rely on your trusted insurance and risk management advisors to help develop cyber risk procedures and secure appropriate cyber liability insurance coverage.

### About the Authors

Blair Koorsen is the Business Development Manager at RBN Insurance Services, and Matthew Dennett is a Vice President with RBN Insurance Services. Contact them at bkoorsen@rbninsurance.com and mdennett@rbninsurance.com, respectively.

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PROVIDING SAFE ACCESS FOR REPAIRS TO A FLIGHT FACILITY’S COMMUNICATIONS TOWER PRESENTED SEVERAL UNIQUE CHALLENGES.

BY ROGER JETTON AND MIKE KROUPA
Wallops Island, a six-square mile island along the coast of Virginia, is home to the NASA Wallops Flight Facility, which, according to its website, provides flight and launch services for both government and commercial sectors “from the Earth’s surface to the moon and beyond.” The facility also supports satellite tracking and commanding, military operations and training, scientific investigations, and technology development and testing. Among the many agencies and organizations that are on site at the facility is the Surface Combat Systems Center (SCSC). The SCSC installation is often referred to as the “Battle Group in the Sand,” because of its capabilities to connect U.S. Navy ships, aircrafts, and land-based sites in the mid-Atlantic region and to support engineering, testing, and training for combat systems in a maritime environment. The flight facility’s 165-foot-tall communications tower, essential to SCSC’s operations, was deteriorating and needed significant repairs and refurbishment.

**Project Scope**

Turner Strategic Technologies, the general contractor for the project, selected Scaffolding Solutions, LLC to provide safe worker access to the entire base tower, including the exterior of the elevator, mast, and antenna platforms. The scaffolding needed to be completed and ready to use before July 6, 2021.

Subcontractors needed access for removal and reinstallation of equipment such as mounts, cabling, and brackets; removal and installation of entire platforms at upper levels of the mast; cleaning, preparation, priming and painting of the entire mast; installation of new fiberglass deck grating; and more. Work also included installation of siding on three sides of the elevator enclosure, replacement of the existing elevator roof, and removal and installation of two platforms on the roof top.

The project is governed by the Army Corps of Engineers, EM-385 Construction Health and Safety Regulations, considered by many to be one of the tightest and toughest performance standards in the industry. The flight facility,

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**Scaffolding Solutions, LLC**

- SAIA Member

Scaffolding Solutions, LLC is based in Richmond, Virginia. In addition to extensive commercial projects, the company routinely works at military installations, U.S. Navy shipyards, and various government facilities in the company’s operating footprint from metro Washington, D.C., to Charleston, South Carolina. Learn more at scaffoldingsolutions.com.
like others governed by these regulations, restricts worker-access to U.S. citizens, with clean background checks necessary for access badging. Scaffolding Solutions routinely works at military installations, U.S. Navy shipyards, and various government facilities, in addition to extensive commercial projects, and is familiar with both the EM-385 regulations and working in restricted-access areas. This environment is challenging in and of itself, but the project scope and timeline made it even more so.

**The Scaffold**
The scaffold is roughly 165 feet tall by 40 feet long and 26 feet wide, with 25 working deck levels. Worker access is provided by using a combination of a stair tower from the ground up to the 85-foot level and StepUp OCTO scaffolding-system internal ladder decks from the roof up to the top of the communications stub mast, 165 feet off the ground.

**Challenges Met**
*Support of Scaffold Structure*
Anchoring the scaffold to the base tower and mast had to be precise to avoid causing any excess lateral load on the deteriorating structures. With the platforms on the mast being replaced, the team was unable to place any scaffold legs on the platforms themselves. Additionally, NASA restricted any ties to the antenna platforms or the adjacent building façade for support of this scaffold structure. The team overcame this challenge by installing the scaffold system’s 5-meter lattice beams which spanned across the antenna platforms and connected directly to distributed scaffold legs, providing the necessary engineered bracing.
Access to the Underside of the Antenna Platform

An octagonal antenna platform 20 feet in diameter hangs off the front of the main antenna mast, and workers need to access its underside for repairs. The Scaffolding Solutions team decided to install a double cantilevered section, approximately 12 feet wide by 24 feet long, on the front side of the scaffold to provide worker access.

“The inclusion of the cantilevered section was particularly challenging, because unlike a typical scaffold, which is supported from below, the erectors had no working platform below them,” said Mike Kroupa, area manager for Scaffolding Solutions.

To circumvent this challenge, the erectors installed double-lattice guard rails outward from existing

The scaffold is roughly 165 feet tall by 40 feet long and 26 feet wide.

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scaffold legs and then attached outside scaffold legs, trusses, and diagonal braces to form the cantilevered hanging scaffold bay. All crew members used dual retractable lanyards, providing critical fall protection safety.

Kroupa said, “Such work can be mentally challenging for leading edge erectors, so good training and experience is essential to safely build cantilevered sections like this.”

Access to the Mast
An additional and critical part of the project scope was for ironworkers to remove, refurbish, and reinstall the whole top section of the 165-foot antenna, the 28-foot-tall stub mast. This portion of the scaffold had to be self-supporting during the time the stub mast was gone. The system scaffolding proved to be the answer and has remained completely self-supporting through many weather-related events, including tropical storm Elsa with 50-mph sustained winds.

“The wedge and saddle connector joints get tighter with use, not looser, providing users a much more stable and safer structure, especially on the coast with routinely high winds, said Roger Jetton, president of Scaffolding Solutions. “Elsa’s high winds were certainly a validating test of the scaffolding system’s locking connections, as well as the carefully engineered system design and proper installation by our skilled crews.”

Ambitious Timeline
The Scaffolding Solutions crew of some 15 workers had two weeks to erect the base tower scaffold and three weeks to get the mast access completed. Putting even more pressure on the team, a June 15th rocket launch caused them to lose a half-day of work, as all non-essential personnel were barred from the island.

Nevertheless, the crew beat their deadlines by several days. They worked six 10-hour days a week and utilized a 60-foot-reach forklift to assist in getting the scaffold materials to the
higher levels. According to Jetton, the innovative system scaffolding helped them to meet the project’s tight deadlines. He noted that the system uses 50% fewer pieces than traditional system scaffolding, which made the work go more quickly.

**Safe Access**

The scaffolding installation was completed incident-free, was designed to be compliant with the Army Corp EM-385 regulations, and remains structurally sound despite the persistent high winds of the coastal location. The work by the general contractor and sub-contractors is underway, and the scaffold is expected to be up until late October.

**About the Authors**

Roger A. Jetton is President of Scaffolding Solutions, LLC and serves as a member of the SAIA Board of Directors representing Region 3. Contact him at rjetton@scaffoldingsolutions.com or (804) 640-1108.

Mike Kroupa is Area Manager at Scaffolding Solutions, LLC. Contact him at mkroupa@scaffoldingsolutions.com or (757) 752-0121.
Prevention through Design (PtD) helps to ensure that safety measures are evaluated and implemented during the programming and design phases of a project.
FALL PROTECTION: A SERIOUS CHALLENGE IN COMPLIANCE AND RISK

This article compares U.S. fall safety performance with that of other nations and further considers prevention through design, the hierarchy of controls, and active and passive means to preventing falls, topics that were previously introduced in the July/August 2021 issue of the SA Magazine.

By Peter Ferguson, Thomas Kramer, P.E., C.S.P., and David Thomas, CEng, FICE, CFIOSH

According to the U.S. Bureau of Labor Statistics, falls are one of the leading causes of workplace fatalities. And, fall protection has been at the top of the Occupational Safety and Health Administration (OSHA) list of Top 10 Most Frequently Cited Standards for the past 10 years. While there have been significant updates to fall protection regulations and standards, and continual updates to fall protection equipment, the number of fatalities continue to increase in the United States. So, the logical question is: Why do falls continue to occur at this rate and how can organizations reduce their fall risk?

First, it’s clear that there is a better way to address fall hazards. Statistics from the U.S. compared to those from similar countries, such as the U.K. and Australia, illustrate the discrepancies in a glaring fashion. These countries have demonstrated that decreasing fall fatalities is possible. By embracing successful tactics from around the world, hundreds of workers in the U.S. could be saved from fatalities every year—not to mention workers affected by serious injuries with days away from work.

Comparing the U.S. with other countries

The chart below highlights the difference in key statistics between the U.S., the U.K., and Australia. While the gross domestic product (GDP) and new construction figures show that the U.S. is producing more, the increase in production is not nearly comparative to the dramatic difference in workplace fatalities (see Figure 1, the numbers in red). These numbers illustrate that there is an urgent problem in the U.S. that needs to be addressed.

What are some possible reasons for the disparity between the outcomes? Three areas may provide the greatest opportunity for improvement in the U.S.

1. Emphasize Prevention through Design

While it is easier to see fall hazards in an existing structure, safety practitioners around the world have found that it is safer and more cost effective to implement fall protection before structures or processes are built. This concept—referred to as Prevention through Design (PtD) in the U.S., led by the National Institute for Occupational Safety and Health (NIOSH)—helps to ensure that safety measures are evaluated...
and implemented during the programming and design phases of a project. Applying PtD has proven to decrease risk and save money. Risk is minimized by eliminating hazards before they’re created and applying solutions at a higher level in the Hierarchy of Controls.

Beyond the risk reduction benefits, incorporating safety at this stage saves money because designers don’t even need to erase lines on their drawings — the safety aspects are simply programmed into the design. Costs are reduced in two ways: in applying the initial solution, and by minimizing injuries, reducing claims, and decreasing lost production time. These savings generally continue for the life of the structure or process.

Organizations who have applied PtD programs have proven meaningful results: life-threatening work hazards are reduced, productivity is improved, and costs are lowered. Despite all these positives, PtD has been slow to gain momentum in the U.S. While an American National Standards Institute (ANSI)/American Society for Safety Professionals (ASSP) standard for this concept exists - ANSI/ASSP Z590.3-2011(R2016) - the other countries place a much more robust emphasis on PtD through the U.K. Construction (Design and Management) 2015 regulation and the Australia Model Code of Practice.

Utilizing a PtD program ensures that safety is considered early and often throughout the design and construction process. Ideally, this becomes part of an organization’s culture, and all parties embrace the idea of addressing safety throughout a project’s continuum. Simply put, safety is no longer an afterthought — it is a more standard, or often more economically and effectively implemented, as it is a more robust, or passive, factor in the design of the building (see Figure 2).

2. Apply the Hierarchy of Controls

To compare fall hazard abatement options, many regulations and standards refer to a concept called the “Hierarchy of Controls.” In this hierarchy, the potential control methods are ranked in order of increasing residual risk (see Figure 3). By following the Hierarchy of Controls in selecting an abatement method, the most effective feasible solution may be implemented.

Some fall protection control methods are considered passive, while others are active. After elimination, engineering controls, which are passive systems, are the most effective since they do not require any specific participation from the worker to function. Active systems, on the other hand, require some — and in various cases, significant — participation by the worker, ranging from staying away from hazardous areas to a lengthy and varied list, including conducting equipment inspections and completing attachments for each work activity. Ultimately, active solutions should only be put into place when passive methods to control fall hazards are deemed impractical.

While the Hierarchy of Controls is a well-known and respected method of comparison, the way this concept is presented in regulations is clearly different. In some cases, such as the U.K., regulations make it abundantly clear that the use of personal protective equipment (PPE) is typically not and will never be as safe as other means of protection that are higher on the hierarchy. In other cases, such as the U.S., all methods are presented as equal, and organizations are given the regulatory flexibility to choose their preferred method — without requiring any justification for doing so.

Building on this concept, in well-developed regulatory areas — including the U.K. and much of Europe, Australia, and Singapore — the designer and employer are held accountable to design and provide the safest practical system while following the Hierarchy of Controls. The lower number of deaths and serious injuries as a result would seem to justify this approach. As organizations, it makes sense to encourage and promote a change toward solutions that provide greater risk reduction in a proactive fashion, before being forced to adapt through regulation.

To support this movement, it could be helpful to investigate how the different methods of protecting workers at height statistically compare to one another and how this can be an indicator of fatalities and serious injuries. This kind of quantitative analysis might provide, for example, clear data that countries with an increased reliance on harness-based methods to protect workers have more fatalities and serious injuries than those with a greater reliance on green-tag scaffolding.

So, while PPE-based solutions are considered the least effective and most “defeatable” solution in the Hierarchy of Controls, their prevalence in the market and ease of procurement often lead organizations to overuse them — giving both employers and workers a false sense of security. This approach, while appearing simple and relatively inexpensive, can in fact, lead to very costly consequences.

3. Strengthen Enforcement Activities

All organizations need to be vigilant about managing their risk — including both safety and financial concerns. Many risk managers focus on balancing the need to reduce risk with the financial impacts. In some U.S. cases, organizations may passively conclude that they are safe if they lack OSHA citations and fall incidents. However, this lack of incidents may be due to luck, rather than an effective program, since falls are rare but catastrophic.

In the U.S., only companies are cited, and
OSHA fines are much lower, compared to other countries, where both employers and individuals can be penalized with significantly higher fines and potential prison sentences. For example, the U.K. introduced new sentencing guidelines for health and safety violations in 2016, and now the average cost of fines is over US$1.25 million. In comparison, even willful or repeated OSHA violations only come with a penalty of $136,532 per violation.

According to Australia’s Department of Mines, Industry Regulation and Safety, the Western Australian Government passed legislation to increase workplace safety and health offense penalties in 2018. With this updated legislation, Level 4 penalties increase from AU$500,000 to a maximum AU$2.7 million and Level 1 penalties increase from AU$50,000 to a AU$450,000 maximum. The changes also increase the maximum term of imprisonment from two years to five years.

While the exact motivation for addressing safety concerns can vary greatly, higher penalties—like those introduced in other countries—will likely drive organizations to address safety more proactively—to reduce their overall risk. If U.S. employers know that a safety violation may come with a $1 million price tag, they have significant motivation to avoid that risk.

In jurisdictions where the actions of designers, owners, and supervisors are personally held responsible for their actions, this tends to be a galvanizing force to perform their jobs well.

Next Steps
As the data shows, fatalities and citations in the U.S. are trending in the wrong direction. Unfortunately, regulations and enforcement policies are slower to change, so each organization must develop a plan to improve safety and reduce risk for work at height.

Here are some recommended ways to apply best practices to minimize fall hazard risk:

- Identify areas where you can better engage workers to address falls from heights.
  - What additional training is needed?
  - How can training drive meaningful engagement?
  - Do you regularly seek input from workers on suggestions to improve safety?
  - Is your organization’s culture outwardly safety-conscious, or secretly (or not-so-secretly) accepting of risk?
- Determine methods you can employ to increase safety and reduce risk for workers at height.
  - Are you guilty of being “harness centric” in your planning and design?

If so, how have you looked at other safer and more practical forms of access?
- How are you using the Hierarchy of Controls to evaluate fall protection solutions?
- Have you considered a Prevention through Design program?

About the Authors
Peter Ferguson is the former owner (retired) of First Access and has represented Australia in the writing of several International Organization for Standardization (ISO) standards and in the International Society for Fall Protection. Contact him at p.ferg@aussiebb.com.au.

Thomas Kramer is a Principal at LJB Inc. and serves as President of the International Society for Fall Protection and as Chair of the ANSI/ASSP Z59 Committee. He can be reached at TKramer@LJBinc.com.

David Thomas is Director and Secretary of the Temporary Works Forum and has contributed to numerous projects and resources related to work at height. Contact him at D.Thomas70@ntlworld.com.

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UNDERWATER SCAFFOLD ERECTION

THE 2020 SCAFFOLD & ACCESS INDUSTRY ASSOCIATION (SAIA) SAIA SUPPORTED SCAFFOLD PROJECT OF THE YEAR AND INNOVATION AWARD AWARDS WERE PRESENTED TO THE TREKKER GROUP FOR THE SEAWORLD FLORIDA WILD ARCTIC DOME REPAIR PROJECT.

BY MICAH TURNER

Erectors/divers erecting scaffold across the lateral side of the pool.
In 2019, SeaWorld Florida needed to provide workers access to the top of the dome in its Wild Arctic exhibit for repairs to damaged sections and maintenance. The scope of the project required standard supported scaffolding. The SeaWorld staff, however, was concerned with the timing and budget. The 300,000-gallon pool would require two days to drain and three days to fill, at a cost of $75 per gallon, or $22.5 million, just to deal with the water, before even getting to the repair work.

Trekker Group offered the solution of building the scaffold in the pool with the water in it. The company has two dive masters on staff who had trained the erectors to work as divers. This solution offered an incredible savings and only five days of work time to erect and dismantle the scaffolding. SeaWorld reviewed the dive plan and safety plan and accepted the proposal.

Worker Safety
The project offered several safety concerns that had to be addressed. The floor of the pool is designed to resemble an arctic rock sea bottom with a wrecked sunken ship on the floor. The scaffold design had to take these factors into account for stability and structural integrity.

Due to the frigid temperatures, hypothermia was a serious concern for the erector/divers. At temperatures of 50 to 60 degrees Fahrenheit with no protective clothing, loss of dexterity can occur in 10 to 15 minutes, exhaustion or unconsciousness at two to seven hours, and death in one to six hours. To

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Trekker Group

- SAIA Member
The Trekker Group provides concrete formwork and shoring supplies and design consultation services, as well as multiple construction-equipment lines, throughout Florida and most states in the southeastern U.S. The Access Division provides all means of access for commercial projects, industrial projects, and special events and specializes in the tourist and entertainment markets. Learn more at https://www.trekkergroup.com/.
overcome this, the team not only used 7mm wetsuits but also put several safety procedures in place.

The crew consisted of 10 people. Two were assigned to ground duty only and would not enter the water. One rescue diver was assigned to be out of the water, and one was assigned to be in the water with the other divers. The six erector/divers worked in the water no longer than 45 minutes at a time and would come out of the water and sit in front of heaters for 15 minutes. Additionally, an extra set of dive equipment, including a tank, buoyancy control device (B.C.D.), and regulator, was sunk to the bottom of the pool in case of equipment malfunction or other underwater emergency in which a diver may run out of air and not be able to surface in time.

Additional training was implemented for the erector/divers prior to the commencement of the project to overcome other obstacles. One of those was the weight of the material. A diver must maintain neutral buoyancy when working in the water. Divers use a B.C.D., which is an inflatable vest, in combination with weights to accomplish this. Once the diver is handed a piece of scaffold material, i.e., a 32-pound vertical, that balance changes immediately. The diver must be able to overcome that weight change and be able to handle the material under water. This is something that divers do not normally experience. And the handling of material for an erector completely changes from what it feels like on land. It becomes heavier and harder to move because of the resistance of the water. Thus, the erector/diver must learn where to hold the material and how to maneuver it all over again.

Animal Safety
The material was an issue that had to be addressed as well. Because this pool is the location for Arctic Ocean animals, the water has an extremely high salt content. There were two main concerns. The first was for the safety of the animals. All the
Pre-work safety meeting and planning

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material placed into the pool had to be new material so that it had no debris on it that could possibly contaminate the pool and endanger the animals. It also had to be completely washed with a bleach solution to ensure there was no chemical residue on it that would be dangerous for the health of the animals. Because of the high salt content, corrosion of the material after the project was completed was a concern as well. Upon completion of the project, all the material was washed down and Salt-Away was applied to it.

Aggressive Schedule
The project was on an aggressive schedule due to a requirement of completing the work before the holiday season began in the park. Erection of the scaffold began on November 11 and took three days to complete. The customer began their work on November 14 and completed their work on November 19. The dismantle of the scaffold began on November 20 and was completed and removed from site on November 21.

About the Author
Micah Turner is Access Division Manager at the Trekker Group. Contact him at Micah.turner@trekkergroup.com.
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THE SCAFFOLD & ACCESS INDUSTRY ASSOCIATION (SAIA) HAS 12 ACTIVE COUNCILS. THIS ARTICLE REVIEWS THE ONGOING ACTIVITIES OF THE SUPPORTED SCAFFOLD COUNCIL.

What has the Scaffold & Access Industry Association (SAIA) Supported Scaffold Council been up to in 2021?
The council has been working on many projects and encourages all members to participate. The council is always looking to improve the scaffold industry, and membership help is appreciated.

The council leadership consists of Chair Wendy Larison, Urban Scaffolding, Ltd.; Co-Chair David Johnson, SkyLine Scaffold; and Co-Chair James McNamara, Safety Scaffolds, Inc.

2021 Projects
Scaffold Component Inspection Guidelines
The Scaffold Component Inspection presentation is now available to SAIA Members. Download it from the SAIA Supported Scaffold Council website, saiaonline.org/supportedscaff. (Figure 1).
Warning Labels
The Supported Scaffold Council is working with the Suspended Scaffold Council Chair Harold Gidish, Sky Climber, LLC, and Co-Chair Jim Boudreau, Tractel, to update the current warning labels (Figure 2). The stock of existing labels has been discounted, so grab them while the price is dropped. The new price will take effect with the printing of the new updated labels.

Convert Tip Sheets to Podcast Training
This year, the council started a new project, converting the Scaffold Tip Sheets into podcasts. While still in the early stages of the updates, Alan Kline, Lynn Ladder and Scaffold, has offered his assistance in converting the Small Scaffold Tip Sheet (Figure 3). The Small Scaffold Podcasts would be great for safety meetings, training breaks, and new hires reference sheets. The council is currently looking to add more quality pictures to make the presentation look top notch and would be grateful to SAIA members who could help out with this project!

Bay Brace Guidelines
Do you ever wonder why a system scaffold looks like it does not have enough bay bracing while other scaffolds look like they would collapse under the weight of all the bay braces that are being installed?

The Supported Scaffold Council is working to produce minimum guidelines for members who use system scaffolds. These guidelines would assist the installers, sales personnel, and inspectors to understand the minimum guidelines of bay bracing, a generic system scaffold.

System Cantilevered Platform Tip Sheet
The council is joining up with Industrial Scaffold Council Chair Bob Gibson, Sunbelt Rentals, and Co-Chair Cody Farrell, Brock Group, to create a Tip Sheet for System Cantilevered Platforms (Figure 4).

The SAIA Supported Scaffold Council encourages all members to help with these projects. Please contact the council leaders for more information.

CONTACT THE COUNCIL LEADERS

Chair Wendy Larison
Urban Scaffolding, Ltd.
urbanw@interbaun.com

Co-Chair David Johnson
SkyLine Scaffold
david@skylinescaffold.com

Co-Chair James McNamara
Safety Scaffolds, Inc.
james@safetyscaffolds.com
The American National Standards Institute (ANSI) Accredited Standards Developer (ASC) A92 Main Committee Meeting will be held from 8 a.m. to noon on Tuesday, October 5, 2021, at Planet Hollywood in Las Vegas, Nevada. This meeting is required as a Main Committee member of the ASC A92.

Member voting will be required during the meeting. This meeting is open to anyone who has interest in the standards that establish consensus rules, guidelines, or characteristics for activities or their results in the aerial platforms industry. Consensus industry standards are voluntarily used by manufacturers, dealers, owners, users, and operators of aerial platforms.

The purpose of the standards is the prevention of accidents and injuries as well as to establish criteria for the manufacturers. The standards also aid the manufacturers, dealers, owners, users, and operators of the platforms to understand their various responsibilities.

The Scaffold & Access Industry Association (SAIA) serves as Secretariat for the A92 series of standards and is responsible for adhering to the policies and procedures outlined in the ANSI Essential Requirements, which govern the consensus development process. For more information about the meeting or to register to attend, visit the SAIA website, saiaonline.org.
Scaffold professionals who continually work in the industry erecting and dismantling scaffolds of various types, regardless of height or configuration, need proper training. The Journeyperson Program consists of three levels of training: Level 1 (1st Year Apprentice), Level 2 (2nd Year Apprentice), and Specialty Level (3rd Year Apprentice). This program also requires documented hours worked for each level of proficiency completed. This program is offered in Canada only.

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Avontus Software Provides Significant ROI

Avontus recently released a new research report that shows that 70.5% of Avontus software users see an improvement in processes and reduction of costly delays with the adoption of technology. The company surveyed Avontus users around the world to find out if their problems are being adequately solved with new technology. This report covers:

- Four key areas of business where users are seeing the most improvement;
- How software helps a company to become more competitive and win bids;
- How technology is boosting productivity and accountability in scaffolding companies; and
- Insight from industry leaders about how they’ve transformed their scaffolding businesses with technology.

Download the free report at avontus.com/library and select “Reports.”

Andrew Smith Promoted to CEO

Andrew Smith was recently promoted to CEO of Avontus Software after seven years of driving operational excellence and growth in the company. Smith replaces Brian Webb, the outgoing CEO and founder of the company. Smith had previously served the company as vice president of operations since 2018. Prior to that role, he led the sales team as sales director of the Europe, Middle East, and Africa region since joining the company in 2014.

JLG OFFERS NEW RT SCISSOR LIFTS

JLG Industries, Inc., an Oshkosh Corporation company [NYSE:OSK] and leading global manufacturer of mobile elevating work platforms (MEWP) and telehandlers, now offers its new generation of rough-terrain (RT) and electric rough-terrain (ERT) scissor lifts in 40-ft and 47-ft models. The new 4069 and 4769 RT/ERT scissor lifts feature class-leading platform size and an 800-pound capacity to carry more to height, as well as full drive at height capability.

The tallest machines in their class, the RT4769 and ERT4769 provide users with access to five-story heights, an industry first. The platforms on the new JLG RT and ERT models are designed to get users closer to the work area while allowing them to bring more people, tools, and material to height. To learn more about the new generation of JLG RT and ERT scissor lifts, visit https://www.jlg.com/en/destination/new-rough-terrain-scissors or watch the detailed walkaround video on YouTube.
SPEAKERS

**KEYNOTE** Larry Silber  
President, chief executive officer and director of Herc Rentals Inc.,  
**TOPIC:** Technology, trust and talent – keys to equipment rental growth.

Tony Groat  
North America regional manager, IPAF  
**TOPIC:** Best practices for e-learning and lessons learned from the past year.

Iris Halpern  
Attorney/partner, Rathod Mohamedbhai LLC  
**TOPIC:** Protecting workers during the ever-changing landscape of Covid-19 and flu season will have its challenges. Haipern will discuss key legal points and guidance for the construction and rental industries.

Ken McDougall  
President, Skyjack  
**TOPIC:** A post-Covid world: From technology to old-school challenges.

Rob Messina  
Senior VP Product Development & Product Management, JLG  
**TOPIC:** Advances in equipment electrification: The latest in battery technologies, proper care/monitoring/maintenance of batteries and what the future of equipment electrification looks like.

Alise Moncure  
CEO, Integrated Rental  
**TOPIC:** Leveraging dynamic rates to drive profitability.

Kevin O’Shea  
Director of safety and training, Hydro Mobile  
**TOPIC:** Key insights into equipment inspection and why it’s of utmost importance.

Luke Powers  
Founder and CEO, Gearflow.com  
**TOPIC:** e-commerce within the construction industry and its impacts on productivity and costs.

Charles Dougherty  
Vice president and economist, Wells Fargo Securities  
**TOPIC:** Economic outlook tailored to the rental and access industries.

Matthew Elvin  
CEO, Snorkel and Xtreme Manufacturing  
**TOPIC:** The electrification of telehandlers and high-reach equipment with a focus on lithium power.

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NEW OSHA RESOURCES AVAILABLE

Heat Illness Prevention
The federal Occupational Safety and Health Administration (OSHA) has new infographics on how to recognize the signs and symptoms of heat illness and what to do to treat them. The resources can be downloaded at www.osha.gov/heat/video-graphics and are available in both English and Spanish.

Construction of Job-Made Boxes for Workers and Materials
A new bulletin, available on the OSHA website, provides instruction on how to safely construct and secure job-made boxes for lifting workers and materials. The bulletin, titled “Hazards of Using Job-Made Boxes/Baskets/Platforms,” states: “In several worksite incidents, workers have fallen from improperly secured and/or poorly constructed job-made boxes. Workers have also been injured when they were struck by or crushed beneath falling platforms. Workers in or on job-made boxes are usually not protected from falling by means of fall protection.”

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