WORKING PLATFORMS

Concerns and the requirement for an industry-wide effort to implement meaningful change when it comes to higher standards of safety

By Jill Harris, Lester Publications, LLC
Every year in the United States, dedicated pile driving rigs, drilling rigs and cranes tip over or experience near misses due to issues involving inadequate working platforms. These preventable incidents often involve serious injuries or fatalities to operators and ground crews, and extensive damage to equipment. Despite the importance of safe, stable working platforms and the dire consequences that can result in their absence, there are currently no specific guidelines or regulations in the U.S. for the design, construction and ongoing maintenance of safe working platforms.

Exacerbating the issue, due to increasing demand for bigger structures that require more intricate, deeper and larger-diameter foundations, deep foundation construction equipment has become larger, heavier and more complex in order to deliver challenging requirements. As well, less desirable sites with very poor soils are now commonly being developed.

“Although this type of rig is typically stable when tracking over a firm, dry surface, if the underlying subgrade has insufficient bearing capacity, under certain adverse loading conditions, this can cause stability issues due to either deformation or even failure of the underlying subgrade material,” wrote Paul A. Gildea, P.E., a senior director of Langan International and co-chair of the Working Platforms Industry-Wide Working Group, in the Spring 2019 edition of the *ASCE News*. “Even something as relatively small as a one-square-meter soft spot can be sufficient to unbalance a rig/crane and cause it to topple over.”

In a 2014 article for the International Association of Foundation Drilling (ADSC-IAFD)’s *Foundation Drilling* magazine, James Finbow, HSEQ manager at Bauer Foundations Canada, wrote, “As an industry, we are continually seeking solutions for [...] challenges and we usually step up to the plate, but we seem to have missed one key part of the equation: the working platform.”

However, in recent years, the topic of safe working platforms has experienced growing attention in the U.S. market. Finbow now says that he believes there has been a change in people’s perception and understanding of what a working platform is and what the industry needs to do to make work sites safer. The ANSI A10.23 drilled shaft safety standard has been recently updated to include more robust language regarding working platforms; the revised standard is scheduled to be published in late-spring 2019.

“Part of [the increased attention] has to do with the great outreach that the different organizations have been doing regarding
working platforms,” said Martin Taube, P.E., P.G., the vice president of business development with Menard USA. “But it’s certainly not that it’s more of an issue now, it’s just that it’s being discussed more. [Working platforms] have been an issue for a very long time.”

Contributing to the difficulty of developing these conversations about working platforms is the uniqueness of the market here. “Part of the problem in the U.S. is that [the market] is so fragmented,” said Gildea. “It’s like you’re looking at 50 different countries, in some respects.”

That fragmentation can make it tough to organize a unified position when it comes to much-needed safety initiatives. However, in 2018, the ADSC-IAFD, the Deep Foundations Institute (DFI) and the Pile Driving Contractors Association (PDCA) came together and published a deep foundation industry consensus position on working platforms for foundation construction and related equipment in the U.S. In the consensus document, the organizations outline that they will support the general guidelines used in the UK, spearheaded in the early 2000s by the Federation of Piling Specialists (FPS), the piling association in the UK.

“The [consensus document] was a big step forward, in my eyes, in an agreement and understanding on this side of the Atlantic that [working platform safety] is something that we as an industry need to lead and need to do,” said Finbow. “The sad part is that often, safety legislation is written in blood. That’s what gets authorities to change. But now, we’re getting a lot of support in the industry to drive this through [and prevent future accidents].”

“It’s organizations like ADSC-IAFD, DFI and PDCA that are very important in bringing together people from all over the country so that we can get some sort of consensus view on how to deal with issues,” said Gildea. “Everyone appreciates that [working platform safety] is a concern, but nobody, until the last couple of years, has stepped up as a collective group rather than analyzing the problem on a micro-basis or by individual states.”

**Working platforms – what are they?**

Essentially, the working platform is the part of the construction site above the natural subgrade on which a rig is placed and that holds the rig level in order to start its foundation construction activity. The working platform is what prevents these large pieces of machinery from tipping over and causing catastrophic damage. The scope of the consensus position from ADSC-IAFD, DFI and PDCA is focused on ground-supported working platforms and includes not only the platform itself, but also its associated ramps/roads and access points.
The working platform is the natural or human-made ground surface or subgrade capable of safely supporting construction equipment, said Timothy Siegel, P.E., G.E., D.GE, a senior principal engineer with Dan Brown and Associates. Anywhere that a rig is driving or working from must be able to support the weight of the equipment and any bearing pressures during construction activity.

“You [also] need a safe area to assemble the equipment – we call that a laydown area,” said Taube. “And then from the laydown area, ramps or access roads to the actual site where the work will be performed [requires an adequate platform].”

“The platform must safely support any type of tracked equipment – whether it be a crawler crane, a piling rig or whatever it may be – under all loading conditions,” said Gildea. “And the way we look at this is under extreme loading conditions; we’re looking at the worst case here because the platform needs to be fully stable under all potential loading conditions for these rigs so that there is no possibility that it can collapse and the rig topple over.”

The duty of the platform is to provide a stable, safe environment for piling contractors and other construction trades to work on, day in and day out.

The concerns
According to Terry Bolsher, former chairman of FPS, approximately one-third of all accidents in the piling industry result from defects in working platforms.

DFI conducted a survey of its membership in 2017 about experiences with working platforms. The results highlighted the significance of the problem. Eighty-eight percent of respondents to the survey indicated that inadequate working surfaces caused safety issues for their company, and 98 percent said that they caused operational issues for their company. Even more alarmingly, 68 percent admitted that their company had tipped a large piece of equipment due to inadequate working surfaces.

“These results weren’t surprising,” said Taube, who along with Matthew Meyer, principal at Langan Engineering and Environmental Services, assisted DFI in creating the survey questions and gave a presentation on the results during DFI’s SuperPile ’17 Conference. “You can see that it’s a huge issue.”

Inadequate working platforms have myriad issues that result in safety concerns.

“The most common hazard is soft soil that is too weak to support the construction equipment,” said Siegel. “The soft ground can...
deform or experience a shear failure beneath construction equipment and result in overturning."

Gildea agrees, adding that soft ground in the upper three meters of the site’s ground profile is a major site issue. “If the rig is on a platform sitting on top of soft grade, that’s a recipe for disaster,” he said.

In addition to soft soil, steep slopes can result in failure, as can inadequately constructed ramps, or platforms that do not have enough coverage over a site. Uneven terrain, ineffectively back-filled utility trenches and poor site drainage can also be causes for concern.

The size of the working platform can be a potential problem, too. “Sometimes the working surface isn’t large enough,” said Taube. “You might not have a working platform in the laydown area or access roads to the site. And then within the site, the working platform may be laid out only to encompass the installation point locations, not considering that some of the equipment may need to traverse out beyond the actual perimeter of the installation area.”

And in some cases, there is no working platform to speak of. “Another issue is that a platform isn’t provided at all,” said Taube. “Either contractually it’s not required, or it’s an oversight. There are still contractors that will go out and work without a working platform.”

“We’re almost taking the moral high ground to get platforms in, and there will be other people who come and say, ‘I can do it for cheaper,’” said Finbow. “We’ve let jobs go where we’ve been uncompetitive through the platform. But we’re a lot bigger and we can take that stance.”

There are no official guidelines in the U.S. for the design and construction of safe working platforms, and so there is no official procedure to mitigate these potentially catastrophic risks. As employers are legally obligated to provide their employees with a workplace absent of serious hazards, according to OSHA, in addition to having a moral obligation to keep workers safe, says Finbow, it’s of critical importance that the industry works to collectively resolve the concerns surrounding working platforms.

“We always think about equipment, but keep in mind the safety of workers just walking across the site,” said Taube. “You can have issues from very slippery surfaces – whether from ice, mud or very slick clay surfaces – but they pose a hazard to laborers and other personnel walking across the site, especially as they carry tools, materials or equipment.”

As Finbow wrote in 2014, “Equipment is expensive, and our people are priceless. We do not want to damage either.” Obviously, the consequences that can result from an inadequate platform are immense, and the risks are high.

“The greatest risk is toppling or overturning equipment, and that’s a catastrophic event,” said Taube. “It’s going to certainly lead to extensive equipment damage, and quite likely lead to injury or loss of life.”

While injury or loss of life, along with equipment damage, are the most critical consequences, there are also secondary effects such as project delays, being removed from the project and incurring a negative safety record, which can affect a specialty contractor’s ability to bid on future projects.

“People may not be aware of potential quality issues associated with inadequate working platforms,” said Taube. “This is the sub-grade or subbase of a structure that’s going to be built on our work. We are, in some cases, turning it to muck, and that’s typically not good for what we’re supporting.”

Quality is a by-product of a safe and level working platform, says Finbow.

“[With a proper working platform,] you install a higher quality product...because your equipment is level and vertical,” he said. “Lastly, you’re more able to reach your scheduled production levels if you get your safety right and your quality right.”
Learning from protocol in the UK

"If we go back to the early 2000s, it was recognized that the incidents of piling rigs falling over because of poor platforms was too high," said Derek Egan, B.Eng., Ph.D., C.Eng., FICE, with Remedy Geotechnics Ltd. in the UK, in a webinar called "UK Working Platform Initiative and Calculation of Rig Bearing Pressure" presented live from DFI's SuperPile '18 Conference. "That’s why FPS launched their working platform initiative."

"I was a piling contractor in Ireland and the UK for many years; I owned my own piling company," said Gildea. "I was involved in the early initiatives back in the UK when we started [discussing working platforms.] What we did in the UK was a lot easier [than it will be in the U.S.], because we probably only had 15 to 20 piling companies at that stage. We had a lot of accidents and quite a few fatalities. The FPS got together and said, 'What can we do about it?' And that’s how it started."

In order to ensure proper working platforms on construction sites, members of FPS created a simple form for general contractors to sign that indicates there is an adequate platform built to a proper design and specification and that it will be maintained by the general contractor throughout construction activities.

"We call it the Working Platform Certificate," said Egan during his 2018 webinar. "It summarizes what the project is, what part of the project [the specialty contractor] is working on [and] under what load the working platform is designed to operate. It names the designer, the designer’s organization and any testing that is required.

"And then the principal contractor has to sign in ink to say that they are confirming the platform has been correctly designed, correctly installed and will be correctly maintained before the piling contractor goes to the site."

Egan says that an early version of the Working Platform Certificate was created in 2004 and that the initial reaction from principal contractors was less than positive.

"In my experience, […] as a subcontractor, you feel like you’re down at the bottom of the food chain sometimes," said Egan in his webinar. "So how do you influence [project owners and general contractors]?

It was through FPS members collectively insisting on the form’s use and refusing to enter sites without one that it became standard practice for both FPS members and non-members alike.

At the same time, a group of specialists was assembled by the Building Research Establishment (BRE) at the direction of FPS to create a unified approach to working platform construction and design that defined the health and safety requirements for safe platforms. BRE published a document titled "Working platforms for tracked plant: good practice guide to the design, installation, maintenance and repair of ground-supported working platforms," also known by the title BR 470, in 2004.

"Working platform safety is now written into health and safety executive guidance in the UK, but that took a long time – almost 15 years," said Gildea.

The Working Platforms Industry-Wide Working Group

The Working Platforms Industry-Wide Working Group was initially created in 2017 after another DFI committee realized the scope of the issue.

"I’m the former chair of the Ground Improvement Committee for DFI, and several years ago, we tried to take on the topic of working platforms," said Taube. "We tried to come up with some guidance [for the industry], but as we worked on the initiative, we realized that it’s a much bigger topic with more relevance than just that committee’s focus. This is a topic that extends basically throughout the entire construction industry."

The Working Platforms Industry-Wide Working Group was formed to start gathering information, such as the existing documents and guidance from the industry experience in the UK, to provide to DFI members. Formally adopting the implementation of working platform certificates is a topic currently up for debate in the Working Group, says Taube.

"That might be the direction we’re heading in," he said. "I don’t think that we’re committed to adopting it in its entirety, and that’s what’s being hashed out now.”

Although there are key takeaways from the protocol that the UK industry followed that the Working Platforms Industry-Wide Working Group believes would be of benefit in the U.S. market.

"The biggest five or six piling companies [in the UK at that time] were the first ones to say, 'We want to take the lead on this,'” said Gildea. "If you look at the $1.5-billion market in the U.S., if you take the top 10 contractors, they probably have about 70 percent of that market. And through ADSC-IAFD, DFI and PDCA, all of them are..."
“Also, what if the work is being done in the winter and we know there’s going to be a lot of snow? If you are working in wet weather or dry weather, there could be significantly different working platform design and maintenance requirements. Significant grading or cut and fill could take place between the time the project is put out to bid and the time the work is performed, making it even more difficult to properly design an adequate working platform. It’s not a simple issue at all.”

– Martin Taube, P.E., P.G., Menard USA
"Let’s say the borings are collected in summer when the groundwater is lower, but the work is done in the springtime when the groundwater is higher and closer to the surface," said Taube.

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**Outlining the responsible party**

"One of the problems we’re grappling with at the moment is who takes responsibility for not just designing the platform, but also for the long-term maintenance of the platform," said Gildea.

"Identification of the responsible entity is the crux of this issue and it must be part of the solution," said Siegel.

He says that as the party with the overall site control, the owner should bear the responsibility for a proper working platform, but that in practice, it doesn’t often work that way.

"Ideally, it’s the owner who should be responsible for ensuring a proper working platform and it should be part of the overall cost of the project," he said. "However, in reality, the very important consideration of the working platform can get obscured in the bidding process as multiple parties try to shed the liability using their contracts."

As a project cost, the working platform can become a so-called bargaining chip in the bidding process. Taube says that because working platforms are not well defined, general contractors and bidding parties are not in a position to put a lot of extra money or allowances for them.

"Unfortunately, the working platform sometimes becomes part of the currency of the bid," he said. "In other words, sometimes we will say that we require a certain thickness of working platform and we might hear, ‘Your competitor only needs one foot instead of two feet. Can you do it with a one-foot working platform?’ Or, ‘I wanted to give you the work, but these other guys are going to do it without a working platform. Can you do that?’ It puts the subcontractor in a position of possibly accepting a less substantial quality or even no working platform."

The consensus of the Working Platforms Industry-Wide Working Group, and noted in the joint position document from PDCA, ADSC-IAFD and DFI, is that the responsibility for providing a safe working platform needs to be acknowledged by controlling entities and considered an integral cost for every project.

"If the responsibility, or at least some of the responsibility, was shifted to the owner, I believe that we would see better working platforms," said Taube.

The party that has control of the site for the full duration is typically the most appropriate entity to have control of the working platform, says Gildea, especially concerning maintenance of the platform.

"In the UK, the piling contractor provides the rig loads [to the principal contractor]," said Gildea.

With that information, says Egan, the principal contractor is responsible for designing the working platform, either using
in-house temporary works designers or by engaging a specialist
geotechnical design firm.

“The maintenance responsibility resides with the GC, who is in
control of the site,” said Gildea. “The piling contractor will flag any
issues on site and the GC will maintain them.”

According to Finbow, he believes that inspection responsibilities
should fall to the specialty contractor.

“We’re using the platform with our rigs... my view is, if I’m going
to put a rig on there, I’m going to make sure that it’s okay. I think
it’s very clear,” he said. “We build platform inspection into our own
site management reporting back to the person(s) responsible for
the maintenance of the platform’s current condition. I would hope
that everybody does that to make sure that the rig is safe and isn’t
going to implicate the safety of their people.”

“It’s a complicated issue and it’s not something that everyone
agrees on,” said Taube.

How to start improving
Since there are no regulations or guidance specific to the U.S. mar-
ket at this time, piling contractors must rely on other sources to
dictate best practices when it comes to safer working platforms.
For contractors interested in learning how they can improve today,
members of the Working Platforms Industry-Wide Working Group
recommend reviewing the BR 470 document as a crucial first step.

“It’s got very good, practical recommendations for the con-
struction and maintenance of platforms, and also good guidelines
on designing platforms,” said Gildea. “[Reviewing that document]
would be the first [step] for anyone in the U.S. If you apply the gen-
eral recommendations in there, you’re taking a step up from where
you would be otherwise.”

Due to copyright, BR 470 is not available through ADSC-IAFD,
DFI or PDCA, but a digital copy can be purchased for £45 (just
under US$60) from BRE by visiting www.brebookshop.com and
searching “BR 470.”

“Review the BRE document and become familiarized with
that, and another good tool would be the [Working Platforms
Industry-Wide Working Group], which is open to the public,”
said Taube. “We definitely encourage participation and hav-
ings discussions with other specialty contractors. Those are the
first steps.”

“Take the knowledge that’s out there – because there is knowl-
edge out there now,” said Finbow. “The knowledge pool is growing
week by week. Join [organizations like ADSC-IAFD, DFI or PDCA]
and benefit from that pool of knowledge. Don’t stand alone; we’re
much more powerful as a group.”

The Working Platforms Industry-Wide Working Group is look-
ing to improve safety across the construction industry, and believes
that, collectively, specialty contractors can make a difference by
insisting on proper working platforms and refusing to compromise
on safety.

“Safety is a responsibility, morally, of all of us,” said Finbow.

“Be bold. Stand up for what’s right and what you know is right
and needed to protect your workers,” said Taube. “Don’t sacrifice
your standards in order to win work. It can be very tempting to
say, ‘Hey, the other guys can do it without a working platform, so
that’s what we’re gonna do.’ It can be a race to the bottom in terms
of working platform safety.”

Your participation is needed in order to improve working platform
safety across the industry. PDCA members interested in joining the
Working Platforms Industry-Wide Working Group should contact
frank@piledrivers.org to learn how to get involved.

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