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Environment, Health & Safety

Best Practices: Building Safety Engagement Through Technology
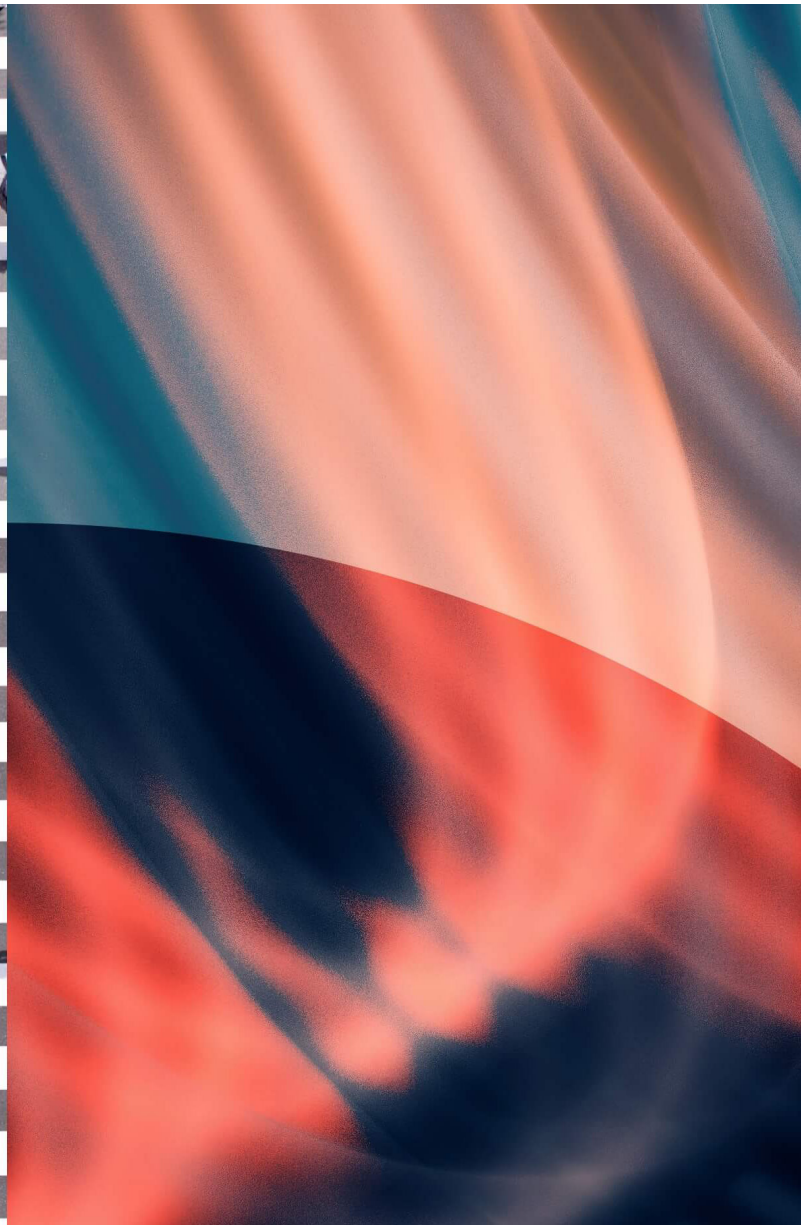
By Zain Idris
With Bill Pennington

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A lack of engagement creates disconnected workers who are increasingly vulnerable to errors. These issues can develop into severe incidents that harm workers' safety. To prevent this, firms are trying to build a safety culture, where each employee understands the importance of safety and engages in the relevant, role-specific processes to support it. This helps organizations focus on small issues and eradicate them before they become major incidents. This report highlights how consistent and clear engagement across a firm can help create a positive safety culture.

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Organizations mentioned

Airsweb, Axonify, Complete Mechanical Services (CMS), Cority, EcoOnline, HIS, Intelex, Linde, Lockheed Martin, Los Alamos National Laboratory, Merck & Co., RelyOn Nutec, Severn Trent Water, Siemens, US Bureau of Labor Statistics, VRdirect.

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Seamless engagement through technology helps foster a safety culture

A safety culture is created when a firm places a high level of importance on safety beliefs, values and attitudes, and this mindset is shared by its employees. Organizations' increased responsibility for maintaining workplace safety has seen many firms adopt this approach. Evidence of its success was made clear in the US Bureau of Labor Statistics 2020 report, which recorded an incident rate of 2.7 per 100 full-time workers. This is a 75% decrease from the inaugural report published in 1972, indicating how a growing safety culture helps to improve workplace safety. However, this has traditionally been difficult as many firms struggle to alter employees' perception of workplace safety (see Verdantix Strategic Focus: The Role Of Technology In Behaviour Based Safety Management Programmes). Data show that serious injuries and fatalities (SIFs) often occur because employees fail to follow established safety protocols and procedures. To tackle this, firms must break down this information barrier and work closely with employees to help them understand the importance of workplace safety and how they can achieve it.

Employee engagement is key to establishing a safety culture

Employee engagement is defined by the level of connection, commitment and involvement individuals feel towards their roles and the firm. An engaged employee will feel a sense of ownership and purpose, which leads to higher productivity levels and job satisfaction. Several factors can influence the overall development of a workplace safety culture, including workplace culture development, leadership and job satisfaction. Research identifies that more engaged employees leads to a greater safety culture, where there are fewer workplace injuries and incidents, greater productivity levels and higher profitability (see Verdantix Merck Sharp & Dohme Drives Strong Safety Culture Engagement Through Safety Training Software). To create a strong safety culture through employee engagement, firms must:

- **Create a consistent line of communication between frontline workers and senior leaders.**
  Employee communication is essential to maintaining an efficient organization. Clear communication helps employees gain an understanding of the firm's strategy, identify with its values and develop a sense of belonging by contributing to the wider purpose. As workers feel more connected and valued, their productivity levels are likely to increase and they are more likely to remain at the firm. However, senior leaders have multiple responsibilities that can take them away from the worksite and therefore limit their ability to regularly engage with frontline workers. Without a clear line of communication, senior leaders may lose track of a project's progress and be difficult to reach when frontline workers have an issue. This can lead to employees becoming disillusioned and losing interest in their roles, resulting in poor productivity and high employee turnover. Workers may also start to make more mistakes that can lead to severe incidents and injuries. Establishing consistent communication enables frontline workers to express any workplace concerns or report risks, which helps to foster a good safety culture.

- **Foster growth and learning opportunities to improve safety knowledge.**
  Sound knowledge is key to limiting risk and developing a strong safety culture, as workers need to be aware of the dangers and how to mitigate them. Safety training can play a pivotal role in this. In the past, safety training has often been overlooked or seen as a check-box activity, with firms providing generic programmes that fail to focus on the key safety skills relevant to each role. In cases like this, workers may step onto a worksite without the safety training for their specific job, making them prone to errors that can place both themselves and others on site at risk. Effective programmes should equip employees with job-specific safety skills, so they are fully aware of what they should do when an incident occurs. This should not just be a one-off exercise. Safety training should be an ongoing process, as if certain skills are not used regularly, then workers may forget them and fail to execute safety procedures effectively in a real-life situation.

- **Encourage employees to take responsibility for their own safety and that of others.**
Safety cultures are either management- or employee-led. The former is a top-down approach, where management takes responsibility and employees have a more passive role. As a result, employees are less likely to engage in health and safety protocol, which can lower productivity and ultimately lead to more accidents. This method is, nevertheless, popular: 60% of UK firms operate with a management-led safety approach and, in 2021/22, 565,000 workers sustained non-fatal injuries in the UK. This high number of incidents is often because a management-led approach creates a culture of fear and blame around safety. Many firms are focused on achieving 'zero incident' goals, which can create complex risk assessments and policies. This may make frontline workers hesitant to report near-misses to stressed health and safety managers out of fear they will be blamed. Instead, an employee-led safety culture is where organizations provide workers with the training and support they need to take ownership of their own safety. This strategy acknowledges that frontline staff face risks daily when performing common tasks and, therefore, that their experience makes them better equipped to perceive risks and ideate solutions.

Increased visibility and productivity are among the benefits of increased safety engagement

Employee engagement is known to be an effective strategy to establish a firm's goals and wider vision. Safety engagement is a key aspect of this, as it not only bolsters workplace health and safety but also helps to achieve these broader organizational goals. A healthier and more safety-conscious workforce increases employee satisfaction and loyalty, while also advancing the wider drive toward greater productivity and profitability (see **Figure 1**). Specifically, increased safety engagement benefits firms through:

- **Improved safety knowledge, leading to a reduction in incidents.**
Through increased engagement, workers are more likely to understand the importance of safety to their work and the firm. An issue with poor connectivity is that senior leads struggle to convey the importance of safety to frontline workers. Often, workers will have to perform safety tasks without receiving information about the benefits – or the potential consequences if they fail to complete them properly. Without this wider knowledge, employees are more likely to skip processes, placing themselves and their co-workers in greater danger. Constant safety engagement will help create a more connected workplace and a workforce that is more aware of surrounding dangers. Workers will understand the importance of safety and why they must undergo certain workflows and procedures to remain safe. Integrating health and safety into daily operations will help it become a cornerstone of employees' work, which will, in turn, help to increase their role-specific safety knowledge. This will equip workers with the ability to predict where common risks arise and what their consequences are. Furthermore, individuals will know what precautionary actions they must take to avoid these risks, which would have previously placed them in danger of causing an incident.

- **Higher levels of employee productivity.**
Establishing a strong safety culture is key to finding a balance between productivity and safety. Often, safety and productivity are seen as opposites, as employees feel that safety protocol can elongate their work processes, making it more difficult to hit targets. However, this perception can be broken down through a strong safety culture that isolates the employee mistakes that lead to incidents. For example, defence manufacturing firm Lockheed Martin found that developing a safety culture at its Paducah plant enabled it to increase employee productivity by 24% and reduce factory costs by 20%. This major transformation was down to its focus on reducing errors that lead to job hazards and accidents. Specifically, Lockheed Martin implemented safe job procedures and extensive training, improved pre-work preparation and audited all safety processes. Ultimately, this enabled plant personnel to increase their safety whilst reducing their expenses, which also boosted productivity.

Figure 1

Benefits of increased safety engagement

Source: Verdantix analysis

- **Greater job satisfaction levels, raising employee retention rates.**
  Low job satisfaction results in a plethora of negative consequences, ranging from lower productivity to high employee turnover. Employee engagement can help here: through consistent engagement, workers are more likely to feel fulfilled and satisfied in their jobs. Workers who feel valued will remain committed, resulting in higher job satisfaction and performance. Satisfied employees are more likely to remain in their roles, creating a more stable and experienced workforce, which is very important in high-risk EHS industries. Workers in these fields are subject to complex risks and must abide by increasingly stringent health and safety requirements. It takes time to develop a sound understanding of this and ensure protection from risk on the worksite – a constantly changing workforce does not have the time to gain this knowledge. Furthermore, without adequate experience, new employees are more prone to making mistakes, which can cause severe incidents. An experienced workforce with a positive safety culture will be more aware of the risks their jobs pose and what they must do to avoid them.

Firms utilize training and technology to help embed a strong safety culture

Employees play a pivotal role in creating and maintaining a positive safety culture within a firm. They are the first line of defence against workplace hazards, so their actions can help minimize health and safety impacts across the wider organization. However, safety culture is not limited to people (see **Figure 2**). Firms can embed safety into workplace processes and leverage technology to facilitate safety management and best practices. Specifically, an organization should build this culture by:

- **Aligning employee attitudes with a safety mindset so it is demonstrated in their behaviour.**
  Workers demonstrate their attitude towards something through their behaviour. An employee who demonstrates corrective behaviour on site will have a positive attitude towards safety, and not see it as merely a burden to their productivity. To develop this safety-positive mindset, workers must first understand the importance of safety in the workplace – specifically, how they should conduct themselves, what the benefits are and what the consequences are if they fail to adhere to the processes. With this information, employees will understand why safety protocol must be followed and are therefore more likely to engage with it, ultimately demonstrating corrective behaviour (see **Figure 3**). To foster this vision, senior leaders must engage with frontline workers regularly to provide them with an understanding of how their safety work contributes to the overarching success of the firm. When this line of communication is open, workers will also feel more empowered to report incidents, understanding that it will not harm their performance but instead reduce the risk of an incident occurring. Take Severn Trent Water, a UK-based utility firm that increased the number of near-miss reports after installing Airsweb (now EcoOnline), and also saw a correlating reduction in the number of actual incidents reported (see [Verdantix The Business Case For EHS Software](#)).

Figure 2
The layers of an organizational safety culture

Layer	Elements	Description
People	Positive safety attitude	Employees understand the importance and benefits of safety to both themselves and the wider organization.
	Behaviour based safety	Employees adhere to safety protocol by exhibiting the correct behaviour while on site.
	Connectivity across teams	Create workflows for frontline workers to connect with senior leadership, ensuring the former feel valued and understand the importance of their roles.
Processes	Digital safety training	Deliver interactive and personalized safety training content specific to each individual's job.
	Encouraging incident reporting	Create an environment where workers do not feel guilty, but are instead encouraged to report on near-miss incidents.
	Proactive safety management	Identify and report hazards in their infancy to prevent them from escalating into serious incidents.
Technology	Streamline routine work processes	Complete common EHS tasks such as audits and inspections much faster, providing more time to address pressing issues.
	Mobile reporting tools	Provide employees with mobile apps to file incident reports and notify EHS leads instantly.
	In-depth performance analysis	Leverage KPI dashboards to measure site-level safety performance relative to set goals.

Source: Verdantix analysis

Figure 3

Demonstration of how safety engagement creates a safety culture
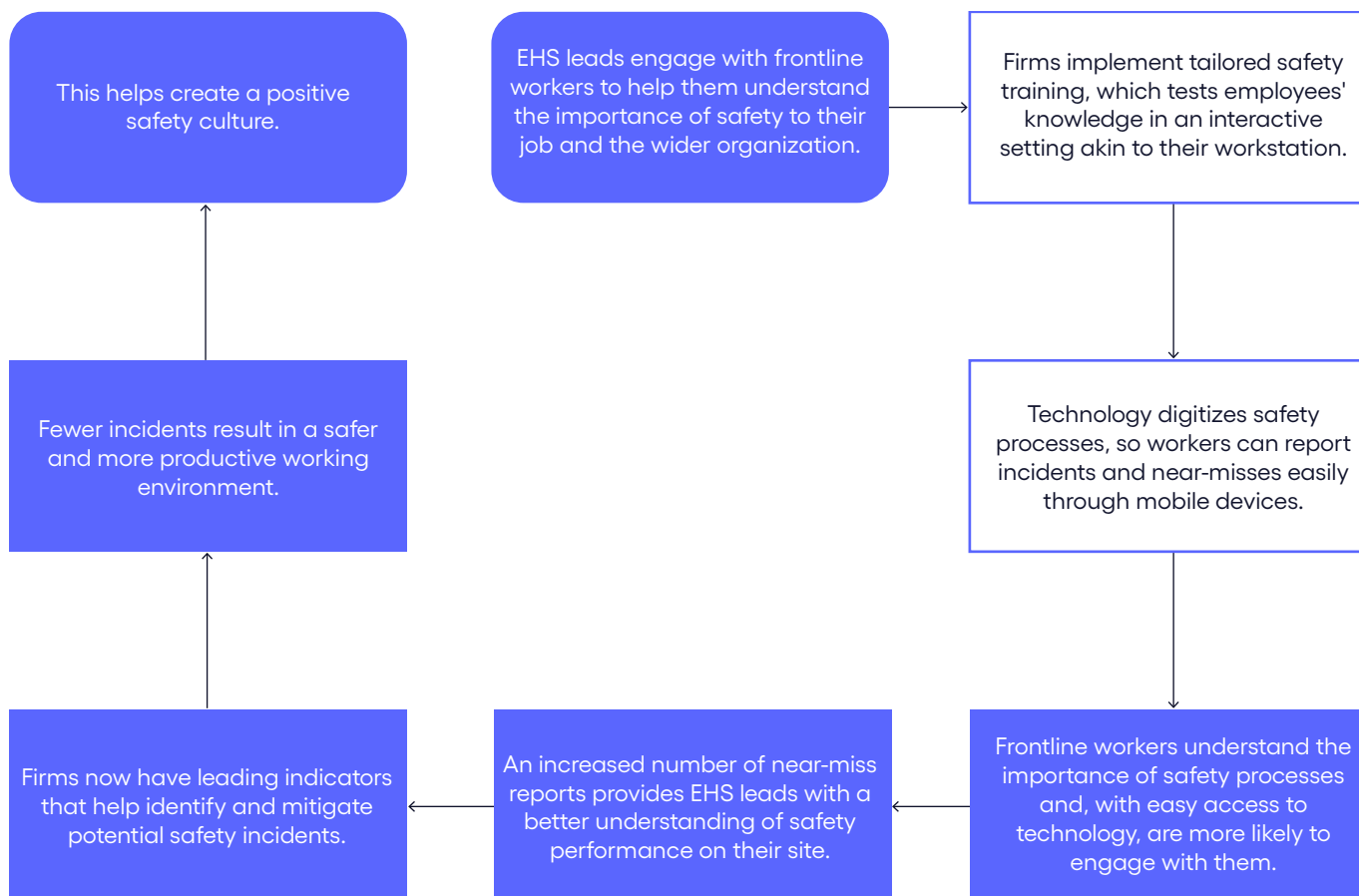
Source: Verdantix analysis

- **Implementing safety training into common workplace processes.**
  It is widely acknowledged that an effective training programme is essential to create a more safety-conscious employee base. Introducing a digital training solution provides firms with a platform to deliver interactive and personalized training content to individuals. The digital aspect also supplies organizations with solid data that they can analyse alongside EHS KPIs. Senior leaders can measure the effectiveness of the training programmes, tweaking processes where necessary. For example, Complete Mechanical Services (CMS) implemented a HSI training management solution, and saw a significant increase in recorded safety observations and a reduction in its total recordable incident rate (TRIR) from 3.9 to 1.5 per 100 full-time workers over three years (see Verdantix Buyer's Guide: EHS Training Solutions 2022). To drive engagement levels amongst employees, EHS training vendors have leveraged technologies, including virtual reality (VR), to provide a more interactive experience. Utilizing digital twins of the working environment enables employees to practise and refine their roles before stepping onto a worksite. RelyOn Nutec, for example, has developed immersive simulation courses for port and offshore processes with crane operation and drilling to help users perfect their skills.

- **Leveraging technology to identify potential safety risks in their infancy.**
  Technology makes it easier to create streamlined feedback loops without needing a direct line to the top. Specifically, mobile reporting tools make it easier for workers to report near-misses or hazards from their smartphones without having to fill out and submit forms to a senior manager. Therefore, employees are more likely to report near-misses, prompting more corrective actions to be undertaken. Furthermore, digital technology helps to streamline routine work processes, freeing up employees' time to analyse data gathered on the worksite and see areas for improvement. Inspections, which are now performed on mobile devices, took much longer to process when they were previously completed with pen and paper, for example. Mobile tools now enable workers to digitally log issues during inspections, alerting managers instantly. This enables EHS managers to assign corrective actions in real time before the issue escalates, ultimately creating a more proactive approach to workplace safety.

Technology streamlines safety tasks, providing more time to analyse workplace safety

Technological evolution has had a significant impact on the way firms operate. Rapid advancements in data analytics, telecommunications and safety monitoring help organizations create a safe and secure work environment. This technology helps to mitigate risks in the workplace and monitor the effectiveness of safety protocols, which would have been conducted by safety officers with the sole ambition of gathering data to remain compliant. Instead, technology fosters a proactive safety culture, as decision-makers can leverage AI technologies to access critical EHS metrics and monitor workplace performance (see Verdantix Market Insight: The Future Of Connected Safety). Various technologies firms use include:

- **Mobile devices that help increase connectivity amongst frontline workers.**
  A mobile platform provides employees with a channel to connect with other workers across the firm. This empowers frontline workers, as it creates a knowledge-sharing culture, connecting with employees even in remote locations. Without technology like this, field service workers can be especially isolated, as they are often working alone in harsh conditions. It is key that firms which operate in these environments foster a safety culture, as workers are exposed to further risk from the external environment and a lack of peers to help if an incident occurs (see Verdantix Strategic Focus: EHS Technologies For Protecting Field Service Workers). Through customized apps, frontline workers can share information with colleagues, and use push notifications to report incidents to EHS managers in real time. This enables frontline workers to connect with EHS managers, potentially reducing the risk of a severe incident. Therefore, mobile apps can help create a sense of connection and inclusion with the organization's overarching safety goals and success. Linde, a global industrial gas and engineering firm, implemented Intelex to encourage frontline employees to report low-severity incidents. These data are now used as leading indicators to prevent future incidents.

- **Dashboarding tools that provide a holistic overview of a worksite's safety performance.**
  As firms migrate to digital solutions, they are seeking technology that can streamline information collated to provide key insights into their worksites. Data sources provide valuable insights into safety operations, but it is often difficult to understand and analyse data on time. However, dashboards visualize the information gathered in a manner that makes it easy to understand and compare performance across the organization. Dashboarding tools include charts and graphs that can help managers identify trends and patterns that would have been difficult to see when analysing raw data. Furthermore, dashboards can be created to measure performance against a firm's safety KPIs – the safety goals it is trying to achieve. Decision-makers can use these KPI-based dashboards to identify where they are succeeding and what they must do to improve. Having this information easily available in real time enables EHS managers to make more informed decisions and manage their resources more efficiently. Since implementing Cority, Los Alamos National Laboratory has shifted from a compliance-driven health and safety culture to a more holistic approach with a clear firm-wide safety vision.

- **Digital solutions that produce interactive, individualized job-specific safety training.**
  With interactive tools, firms can personalize safety training programmes. These digital solutions come with learning management systems (LMSs) that help to schedule, administer and track each individual's training performance. Through machine learning algorithms, LMSs can develop programmes that are adjusted to a worker's learning preferences and their current job requirements. Take Axonify, which leverages AI to provide customers with specific training based on an individual's safety performance metrics. These technology advancements have helped extend tailored training programmes beyond the classroom. Immersive training places workers in scenario-based walkthroughs with the opportunity to practise their safety knowledge in a protected environment. Take Siemens, which has collaborated with VRdirect to create virtual tours of industrial facilities and test its safety training in a virtual 'escape game' (see [Verdantix Market Insight: Mixed Reality And EHS In The Metaverse](#)).

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