WORKtoZERO

an nsc program

# Managing Risks with EHS Software and Mobile Applications

# Executive Summary

This report focuses on the use of Environment, Health and Safety (EHS) software and mobile applications in increasingly digitized workplaces, reviewing how its deployment can reduce the risk of serious injuries and fatalities. Exploring key use cases – risk identification, incident recording, permit-to-work and safety audits – this report covers the streamlined, augmented and fully-automated workflows enabled by EHS software.

In addition, it identifies how small organizations may benefit from off-the-shelf, modular and flexible packages while large enterprises often proceed with lengthy and costly customized deployments with a far more comprehensive result. Advances in data analytics, artificial intelligence, machine learning and customer-friendly graphical user interfaces provide powerful insights for safety management personnel from any device, on-site or remote, through cloud computing.

Additionally, the report discusses the limited availability of comprehensive EHS software for smaller organizations, in particular industries where an out-of-the-box solution has yet to be created. Finally, it provides an overview of the market landscape, reviewing vendors providing workplace EHS software solutions.

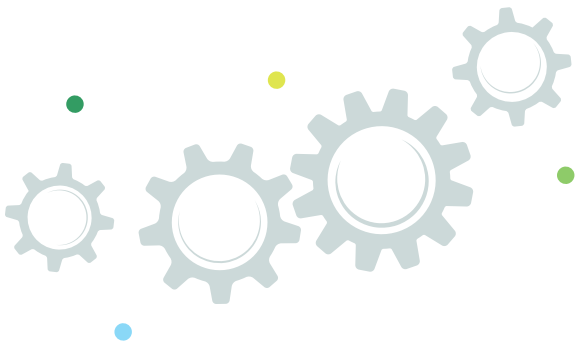
### Key Findings:

1. EHS software packages from a variety of vendors are powerful and comprehensive tools helping to reduce errors, increase data collection and streamline workflows through digitization.

2. Worldwide, only 8% of EHS functions have widely adopted artificial intelligence (AI). However, 16% aim to increase the use of this technology, and another 16% plan to pilot AI solutions in 2023. Overall, 67% of EHS professionals in industrial operations expect AI or predictive analytics to be a focus area for 2022 and 2023.

3. EHS software deployments vary depending on organization size, with larger operations undertaking longer, more expensive implementation projects with custom features to best meet their complex EHS software needs. Smaller businesses generally choose modular software with pre-built functionality for common EHS workflows for quick deployment and lower cost.

4. When buying EHS software, organizations should ensure the software can scale with organizational and EHS needs; establish the extent and ease of a vendor's platform configurability; select vendors with powerful business intelligence (BI) tools; identify EHS functionality needs specific to their industry and region; and realize the importance of software usability in dictating platform engagement level.



# Introduction and Background

## Work to Zero

Despite concerted efforts to reduce serious injuries and fatalities (SIFs), workplace fatalities have not seen a drastic reduction in the United States. Between 1992 and 2020, the OSHA recordable injury rate dropped from 8.9 injuries per 100 workers to 2.7 injuries per 100 workers, a nearly 70% decrease (Injury Facts, 2021). In the same period, the workplace fatality rate (preventable fatalities) dropped only 17%, with 4,113 preventable fatalities occurring in the workplace in 2020 (Bureau of Labor Statistics, 2021). There were 4,764 total fatal work injuries recorded in the United States in 2020, an 11% decrease from 5,333 in 2019, although this is likely due in part to the economic disruptions triggered by the COVID-19 pandemic. Between 2019 and 2020, the fatal work injury rate fell from 3.5 to 3.4 per 100,000 full-time equivalent workers. Thus, the expansive efforts by companies to reduce workplace injuries do not seem to translate into impactful reductions in workplace fatalities.

**Recognizing this trend, in 2019 the National Safety Council (NSC) kicked off its Work to Zero Initiative, supported by a grant from the McElhattan Foundation, to focus on combatting the lagging decline in workplace fatalities and serious injury events. The end goal of the Work to Zero initiative at NSC is to eliminate workplace fatality risk through the use of technology. Using decades of insight, data, and leveraging the expertise of its membership and network, Work To Zero will identify promising technology innovations geared towards eliminating workplace fatality risks within our lifetime.**

## Digital Technology as an Approach to Reducing Workplace SIF events

In 2020, the Work to Zero initiative released its first white paper detailing the top eighteen hazardous workplace situations (e.g. work at height, machinery operation, confined space entry) and associated situational risks (e.g. falls, struck-by, hazardous gas exposure). The report went further and identified the systemic contributing factors (e.g. lack of training, fatigue and work design) that can exacerbate risk within these hazardous situations. Next, NSC worked with Verdantix researchers to identify over 100 relevant EHS technologies helpful in mitigating both situational and systemic risks and mapped these risks in ways surveyed EHS professionals perceived to be most effective.

The initial Work to Zero report identified several key technologies garnering the most interest and value among the surveyed professionals. In addition, safety leaders within the Campbell Institute at NSC have demonstrated interest in assessing and evaluating certain technologies – such as virtual reality, wearables, sensors and unmanned aerial vehicles (drones). This is one in a series of reports taking a more focused look at specific risks and an associated promising technology.

**This report will look at the use of EHS software and mobile applications for reducing injury and fatality risk, and managing incidents in the workplace. It will examine the various use cases associated with the safety management of industrial operations through software tools and their ability to help prevent injury, fatalities and illnesses. Additionally, it will explore the identified benefits of this technology as well as the limitations and risks associated with adoption, plus how employers can overcome these barriers. Finally, it will provide an overview of the EHS software vendor landscape for use in the workplace.**

# Research Approach

**The methodology of this paper consists of two separate actions:**

- **Identification of case studies and suitable applications for EHS software solutions**
- **Development of a market landscape shortlist of relevant vendors associated with this technology**

Data for this paper came from vendor interviews and reviews of publications related to this technology (see References). While the EHS software market is comprised of vendors with wide-ranging capabilities, most are specialized in providing tailored solutions for large enterprises in a handful of industries. Research on the vendor landscape was conducted by identifying those industries with the greatest number of casualties, such as construction and warehousing, and speaking with several larger vendors to assess their scope. This paper will focus on aspects of EHS software specifically tailored to identifying, quantifying and reporting workplace incidents that may lead, or have led to, illness, injury or death.

# Introduction to EHS Software

EHS management refers to the legislation, industry regulations, corporate strategies and initiatives designed to protect the health and safety of employees, the public and the environment from hazards associated with the workplace.

EHS management is often a critical part of an organization's risk management system, especially those following a corporate structure or having a more robust safety framework. EHS software provides a variety of features and functionalities, such as the standardization, augmentation and automation of workplace safety data collection and management. By deploying EHS software as an alternative to handwritten and spreadsheet-based EHS workflows, organizations can better understand and manage risks, monitor performance and stay in compliance with workplace legislation and regulations. By gaining real-time safety reports, organizations can alert rapid action teams to take preventative measures to control occupational hazards (NAEM, 2019).

## Types of EHS Software

**EHS software can be distinguished by its deployment options:**

**1. Enterprise Model – On-Premise EHS Software**

**2. Software-as-a-Service (SaaS) Model – Cloud-Based EHS Software**

Enterprise software is purchased and installed on an organization's servers by their IT team, often with extensive customization to ensure integration with existing systems and Internet of Things (IoT) devices. Critical updates must be rolled out by staff, and if improperly implemented, on-premise deployment can result in additional security vulnerabilities. On-premise deployment also tends to have higher upfront costs, scalability limitations and reconfiguration complexities. However, because enterprise software tends to be more customizable and offers more functionality than software-as-a-service, it may be better suited for larger or more mature organizations that can manage the integration of the software.

SaaS typically involves a subscription or usage-based software pricing model operating on cloud-based hardware, which could offer higher flexibility, scalability, security and accessibility to ensure EHS data and insights are available to a variety of mobile devices and platforms. A further advantage of SaaS is that minimal-to-no installation time is required – the software can be used in a lightweight internet-connected application or web browser interface as soon as it is purchased, with automatic updates performed by the software vendor. However, some SaaS models encounter issues in larger enterprises where sensitive customer data is stored on third-party servers and accessible by software vendors.

**EHS software can also be distinguished by its feature modules:**

**1. Customized EHS Software**

**2. Off-the-shelf EHS Software**

Customized EHS software is usually selected by larger industrial organizations to meet all of the company's precise operational needs – ensuring every feature and module going into the system is compatible with its hardware, software and data requirements. This process can be time-consuming, ongoing and expensive, and is often assisted by the software vendor's dedicated implementation teams. When effectively implemented, this package can help an organization resolve every unique challenge posed by its safety processes, providing a valuable advantage over competitors.

Off-the-shelf EHS software is built with ready-made feature modules designed to be quickly implemented into an organization's EHS workflows, often suited to companies with partial, internally-developed or nonexistent EHS processes and with entry-level pricing schemes. However, some operations within specific industries or operating with specialized equipment and processes may not fully utilize the EHS software solution, may have processes not accommodated by the EHS software solution or may be forced to manage disruptive changes to established workflows and facilitate additional worker training to meet requirements not necessarily relevant to their industry.

## Use Cases

**There are four key EHS software modules:**

**1. Hazard Identification and Risk Management**

**2. Permit Management**

**3. Incident Management**

**4. Safety Audit Management**

**Risk management and hazard identification (HIRA**) is a critical EHS initiative. By adopting a fully digitized reporting workflow and ensuring real-time information is shared across an organization, risks can be identified earlier and hazards better understood and avoided. This enables companies to better design and implement their control measures, contributing to an overall safe work environment.

**Permit management** software formalizes and accelerates Permit to Work (PtW) requests and approvals for workers operating in dangerous environments or within machinery. EHS software platforms provide workers with the ability to autofill common fields such as the location and time of a PtW request alongside a consistently-formatted description. These can then be digitally sent to the site manager alongside additional relevant real-time data from across the facility or enterprise to deliver a thorough, rapid review and approval while ensuring safe procedures, controls and worker certificates are in place.

**Incident management** systems facilitate the recording and reporting of workplace incidents alongside near-misses as part of a facility-wide or enterprise-wide software solution. This EHS software module helps formalize recording and extract key information to help safety personnel determine the root cause of events and take corrective and preventative measures based on data-driven insights. Put simply, incident management software offers real-time visibility of an entire organization's EHS performance.

**Safety auditing** software enables a company to investigate and analyze any non-compliant processes or activities in the workplace through the rapid and consistent generation of inspection schedules, checklists, forms and reports based on established best practices. EHS software combines data streams from across an organization to auto-populate common form fields and provides mobile app-based recording and inspection reporting performed by workers as part of existing operational workflows. These records are immediately available to EHS personnel for further auditing, analysis and producing of customizable reports for advising possible improvements.

# Vendor Landscape

| EHS Software Scope and Features | Small-To-Medium Enterprise | Large Enterprise |
|---|---|---|
| Contractor Safety Management | Alcumus, Cority, SAI Global, Intelex | Alcumus, Cority, IsoMetrix, SAI Global, Sphera |
| Mobile-Focused EHS Solutions | Benchmark Digital, Cority, Intelex | Benchmark Digital, Cority, Enablon, Newmetrix |
| Incident Management | Cority, Intelex, ProcessMAP VelocityEHS | Cority, Enablon, VelocityEHS |
| EHS Risk Management | Cority, Intelex, SAI Global, Sphera | Cority, Enablon, Intelex, IsoMetrix, SAI Global, Sphera |
| Safety Training | Alcumus, Benchmark Digital, Intelex, SAI Global, VelocityEHS | Alcumus, Benchmark Digital , SAI Global, VelocityEHS |

## Case Studies

1. **Alcumus, an EHS and ESG firm with its North American headquarters in Toronto, worked with K-Line Maintenance and Construction (Alcumus, 2021), a Canadian utilities subcontractor, to facilitate growth while eliminating the constraints of existing Excel-based safety tracking processes. As the number of construction projects grew, so did the complexity of safety-related administrative tasks. In addition, their existing system did not offer easy access to safety data for incident analysis and to spot EHS trends. After implementing EHS software from Alcumus, K-Line was able to improve safety, determine root causes of incidents and scale operations without the need to proportionally scale administrative personnel headcount, all while maintaining complete oversite of their safety program.**

2. **IsoMetrix, an EHS software firm with North American offices in Atlanta and Toronto, worked with De Beers Group (IsoMetrix, 2020), a diamond mining multinational, to deploy IsoMetrix EHS software in several business regions, including three mines in Canada. The aim was to produce a custom solution catering to the large scale of De Beers' operations while ensuring site-level configurability and minimizing disruption to existing EHS processes. Through this project, De Beers upgraded existing EHS software systems to reduce complexity, improve data visibility across all operations and improve safety.**

3. **VelocityEHS, a Chicago-headquartered EHS and ESG software firm, partnered with Frazer, a Texas-based emergency medical services (EMS) vehicles manufacturer employing 200 people, to improve its disjointed safety data workflows and improve incident and policy management and data visibility across its manufacturing operations (VelocityEHS, 2021). VelocityEHS provided a solution allowing centralized safety information accessibility, ready-to-use EHS templates, a graphical user interface with notifications and mobile device EHS software access. Employees took only one week to understand the EHS software solution and began recording hazards and near misses – and with facility-wide data access, safety personnel were able to perform detailed investigations through data analysis in collaboration with the wider workforce.**

# Benefits of Leveraging EHS Software

**Ensure worker safety:** With in-depth recording and reporting capabilities, this technology helps companies adhere to applicable safety standards – clarifying the state of health and safety key performance indicators (KPIs). In addition to preventing employee injuries, this tool can limit costs from lawsuits, workers' compensation and new worker recruitment efforts.

**Generate deeper insights:** In an EHS management system, data is centralized and acquired from a variety of sources across the enterprise and can be tracked and monitored. As such, this software allows companies to analyze trends and ensure proactive safety measures are implemented within the workplace. With IoT and cloud-enabled EHS software platforms, dashboards are updated as soon as an incident occurs. This ensures the latest statistics and figures are available such as photo evidence, witness statements and an account of the steps taken to reduce risk.

**Ensure compliance with regulations:** An EHS platform helps companies keep up to date with regulatory changes and stay in line with regional regulatory bodies, such as the Occupational Health and Safety Administration (OSHA). A workplace incident can result in costly fines, so avoiding non-compliance is elemental. For example, fall protection will be prioritized in the EHS system for the construction industry, meaning capabilities such as equipment tracking and custom inspection checklists are needed to ensure a safe workplace environment and adherence to the law.

**Reputation:** A poor safety record can create considerable reputational damage, as the expectations of a safe work environment and increased transparency by investors and wider society grow. There is growing scrutiny of supply chains that has the potential to affect customer relationships and the ability of a company to win tenders. Weak EHS performance can not only reduce workplace morale, but can also enhance the challenge many companies already face in recruiting future talent. It can also deter current or potential investors from supporting a business.

**Report through mobile technology:** EHS software systems can be deployed and accessed on remote devices like smartphones and tablets. These are essential tools for keeping people safe, minimizing risk and maximizing workforce productivity. Mobile EHS software enables workers to quickly and accurately record and report incidents. Some systems even have offline capabilities, allowing access and useful functionality even if wireless connectivity is unavailable. EHS mobile apps can be available as native apps, browser-based web apps or hybrid apps. Their key uses include audits and inspections, incident reporting, real-time safety alerts, and safety information access on chemicals (via online barcodes/QR codes) and other potentially hazardous substances or equipment.

**Reduce negligence:** According to EHS Today, 32% of mid-market organizations are concentrating on the implementation of processes and software for incident management. However, only 28% of mid-market organizations are seeking to manage and mitigate the risk before it occurs. Improving in this area presents a more cost-efficient pathway to reduce negligence (Bobbitt, 2017).

**Reduce insurance costs:** By improving workplace safety, the potential costs of insurance can be reduced. According to OSHA, successful health and safety programs can reduce injury and illness costs by 20 to 40% (Ellison, 2015).

(Zuckerman, 2019; Nair, 2020; & Graham, 2020)

# Risks and Considerations in Using EHS Software for Workplace Safety

## Barriers to Adoption

As with any technology, EHS software does face some barriers that prevent its widespread adoption. A certain level of technical expertise is required to operate these platforms. Thus, time must be taken to sufficiently train a company's workforce. In cases where this is not feasible, it is useful to select a software provider that supplies technical support and resources.

Depending on the organization's readiness for digital change and safety culture, companies might experience unexpected resistance from employees regarding the change of systems. Educating across all levels of the organization is a critical step in technology deployment. Companies must ensure buy-in and engagement with such platforms begins even before the software is purchased and continues throughout the acquisition and implementation process.

Partial compliance management must also be recognized as a potential risk. Unfortunately, not all EHS software can support a wide range of compliance regulations. As such, companies must check the inclusions of a variety of platforms before investing their money. Similarly, organizations should focus on investing in software solutions that have industry-specific standards applying to their business area.

# Key Considerations When Buying EHS Software

For buyers of EHS software, looking inward and assessing your organization's future and unique needs is a necessity. However, there are a few general considerations for purchasers to be aware of and take into consideration:

1. **Ensure software scales with your organizational and EHS needs.** This includes selecting a provider that fits your level of complexity. Buyers should understand the pricing structure and level of effort relating to add-on modules. Another crucial aspect is conducting due diligence on providers' future roadmaps, overall product strategy and level of continued investment in the system. Finally, the ease of systems integrations enabled by open data architectures and application programming interfaces (APIs) are important factors as firms' wider enterprise ecosystems evolve.

2. **Establish the extent of a vendor's platform configurability and ease of configuration**. Before software selection, buyers should clearly define their configuration needs across form creation, formula and metric changes, dashboard configuration, workflow creation, terminology definitions and business rules. By empowering EHS functions to make changes, in-house developers can cultivate an EHS software platform that is up to date and reflects current EHS processes. In addition, buyers should look out for no-code tools and drag-and-drop user interfaces (UIs) to fast-track configurations.

3. **View business intelligence (BI) as a differentiator during selection.** Before assessing providers' BI tools, buyers should determine their EHS intelligence strategy. Organizations that have an existing BI platform, such as Power BI or Tableau, require direct integrations to conduct detailed EHS analysis in the third-party BI software. The built-in BI capabilities of the software enable standard daily and monthly dashboarding. Alternatively, organizations that perform all EHS reporting, charting and analysis using built-in BI tools will require a more sophisticated BI functionality.

4. **Identify EHS functionality needs specific to your industry and region.** Buyers should assess the EHS software challenges unique to their industry and region so they can prioritize certain functionalities. Regional language barriers, country-specific regulations and knowledge of union and legislator interaction and reporting processes mean localized vendors can offer several advantages.

5. **Realize the importance of software usability in dictating platform engagement level.** Buyers are looking for clean, visually-appealing menu pages and dashboards with smooth animations, fast loading times and intuitive interfaces minimizing the number of clicks to reach the required functionality.

(Verdantix, 2020; 2021)

# Conclusion

EHS software is ready to deploy and deliver a return on investment in terms of reducing the risk of workplace injury. Leading vendors offer a range of deployment options for large enterprise customers, where high levels of customization and integration with existing systems are facilitated by dedicated vendor implementation teams. Options are also available for smaller specialists or contractors, where pre-built packages are available on cloud-hosted platforms for a variety of common industrial environments and EHS workflows.

**By deploying EHS software, organizations have the opportunity to better understand and manage risks, monitor performance, and stay in compliance with workplace legislation and regulations. Companies can receive real-time safety reports, allowing them to alert rapid action teams, take preventative measures and control occupational hazards.**

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