NEW TECHNOLOGIES
to Support Sustainable Safety Management Systems
By Heather Chapman and Greg Zigulis

ISO 45001 is an internationally recognized benchmark and the first truly international standard on the management of OSH. Conformance to the standard has been made a requirement in many supply chains and even carries the weight of law in some countries.

The standard serves as a comprehensive framework for organizations to implement an effective occupational health and safety management system (OHSMS) to provide a safer, healthier workplace. While the primary aim of this article is to highlight how technology can assist in conformance to ISO 45001, the ideas and strategies presented here can enhance any OHSMS.

Seven requirements sections describe processes that organizations must have in place to conform to the standard. While the standard can at times be prescriptive, in many cases it describes necessary processes broadly, leaving the specifics of implementation to the organization.

The standard outlines broad requirements for organizations to develop and implement a comprehensive OHSMS. This includes creating an effective policy and establishing clear objectives, as well as processes for managing risks, legal requirements, and monitoring hazards to assess risk and apply appropriate controls. It also emphasizes the importance of promoting a culture that supports OSH goals, including actively seeking ways to reduce risk, acting on identified opportunities, and increasing overall awareness and vigilance. In this way, the standard helps organizations create a workplace that prioritizes worker safety.

The implementation of an OHSMS showcases an ongoing commitment to safe work practices and the provision of business infrastructure to support practical steps toward capability, consistency and resilience in safety performance.

Ergonomics should be considered when striving to meet the standards set forth in ISO 45001. In the authors' experience, ergonomics-related injuries are a high percentage of lost time injuries and associated costs, and can impact the organization operationally as well. If manual material handling and ergonomics play a significant role in a company's risk exposure, it may be beneficial to explore the potential role technology can play.

With the rise of safety technologies such as wearable devices and vision processing for task and risk assessments, organizations have a convenient way to conduct high-quality, data-driven hazard identification and risk assessment. Beyond that, organizations have a unique opportunity to set in place a structure that facilitates meaningful collaboration between management and workers.

This article examines how these technologies can aid companies in addressing ergonomic risks and manual handling training as part of their journey toward ISO 45001 certification or conforming to other management systems standards.

Understanding Safety Technology for Musculoskeletal Injury Risks

A pivotal component of modern safety management standards is identifying and managing hazards and associated risks. The standard specifically highlights the significance of considering ergonomics-related elements such as human factors, work area design and process adaptation to worker capabilities.

In recent years, organizations worldwide have incorporated artificial intelligence (AI)-driven technology into their OSH processes. These solutions include small wearable devices that can detect risky movement and alert wearers to alter their behaviors to reduce their risk of injury. Vision processing technology provides objective risk data and insights. These solutions and others like them enhance awareness and contribute to a positive shift in organizational culture.

The following discussion highlights four areas of conceptual emphasis of the ISO 45001 standard and illustrates how use of safety technology can help organizations conform with the standard. Specific ways this technology supports conformance are discussed in detail, drawing from the authors' perspectives and experiences.

Participation & Awareness of Workers
Section 7.3

The ISO 45001 standard highlights the need for the active involvement and participation of workers across all company levels and departments. This starts with creating awareness among workers about potential hazards and risks as outlined in Section 7.3 of the standard, as well as their own ability to evaluate hazardous situations in the workplace.

While useful, conventional methods of creating worker awareness such as periodic classroom training often result in short-lived awareness. Daily tasks can easily divert a worker's focus away from hazards and risks, reducing the person's overall awareness. However, employing safety technology such as wearable devices that provide real-time feedback can make awareness a continuous, integrated aspect of daily work processes.

Section 5.1 & 5.4

According to the ISO 45001 standard, the active involvement and consultation of workers in safety processes is a crucial aspect of OSH. This is mentioned in Section 5.1 and detailed in Section 5.4. The standard emphasizes the importance of worker participation in establishing OSH objectives, identifying hazards and risks, and implementing control measures to reduce or eliminate those risks.

However, actively participating in safety processes can prove challenging for workers, with limited opportunities and difficulty recognizing risk factors. Wearable technology can serve as a solution by providing workers with the necessary tools and education to engage in safety processes and communicate effectively about their own safety. While many ways to encourage participation exist, the use of technology promotes a new, unique way of obtaining feedback and collaborative participation.

Section 7.4.2

Section 7.4.2 also describes processes that involve workers. This clause outlines the requirement for an effective communication system that facilitates processes for workers across the organization to contribute to continual improvement. Without the tools to understand the daily risks they face, it can be difficult for workers to communicate effectively and contribute to the organization's continual improvement initiatives.

Wearable safety devices can provide workers with insight that they might not otherwise have. For example, how often do

you frown or furrow your eyebrows without realizing you are doing so? Typically, it is not until someone mentions it that you become aware of this habit. Wearable devices alert employees to poor body mechanics that they may not even realize they are doing. This insight enables workers to not only understand and improve their own safety, but also to participate in broader organizaional conversations about OSH.

Proactive Hazard & Risk Management
Section 6.1.2.1 & 6.1.2.2

The ISO 45001 standard lays out a comprehensive approach to hazard identification in Section 6.1.2.1, which requires organizations to proactively identify potential hazards in the workplace. This approach must take into account factors such as the organization of work, human factors, the design of work areas, processes and equipment, and the individual needs and capabilities of workers.

The standard places strong emphasis on the need for this hazard identification process to be proactive, not reactive, as outlined in Section 6.1.2.2. It points out the need to specifically consider ergonomic hazards in the hazard identification process.

Creating a proactive approach to hazard identification can be challenging without proper tools. While human observation and manual assessments can help identify potential hazards, there is still a risk of missing critical information. The use of predictive analytics and wearable technology can enhance hazard identification and make it more proactive. The AI and machine learning capabilities of this technology enable the processing of large amounts of data, identifying patterns and specific areas of risk.

For example, wearable technology that integrates data analytics enables organizations to detect, objectively quantify, and analyze ergonomic hazards with high accuracy and reliability. The use of vision processing technology further supports risk assessments by capturing details that might be missed by the human eye. This results in a more comprehensive, proactive approach to hazard identification, helping organizations identify potential hazards before they result in injury.

Section 6.1.2.3

Section 6.1.2.3 of ISO 45001 requires that an organization maintain processes to assess opportunities to actively improve. This includes adapting the work, work organization, and environments to individual workers and monitoring for any opportunities to eliminate hazards and reduce OSH risks.

Wearable safety technology that is driven by AI and machine learning can analyze vast amounts of data specific to individual workers. By adapting to the unique needs and capabilities of each worker, this technology enables organizations to personalize their OSH processes and create work, work environments and work organizations that support the safety and health of each worker. In particular, vision processing technology can provide insights about the specific risks associated with a worker's movements, facilitating targeted improvements to work processes and tasks.

Moreover, wearable safety technology continuously collects and organizes data, which can be easily analyzed and reported on. This enables organizations to continuously monitor opportunities for improvement, identify patterns and trends, and make ongoing updates to OSH processes.

Monitoring & Measuring Objectives, Progress
Section 6.2.1, 6.2.2 & 9.1.1

Monitoring and measuring OSH objectives and progress are fundamental to achieving and maintaining ISO 45001 certification. Section 6.2.1 states that objectives should be measurable and monitored. Section 6.2.2 also requires that a company decide how results will be evaluated and which indicators will be used for monitoring.

Section 9.1.1 sets forth the requirements for the process to monitor, measure and analyze. As part of this, an organization should monitor and measure actions taken related to the hazards, risks and opportunities identified, progress toward achieving objectives and the effectiveness of controls implemented. The results from this measuring and monitoring should also be analyzed, evaluated and communicated.

Monitoring such aspects can be a complex task. However, technology can simplify the process by monitoring various hazards, analyzing data and presenting results. The use of technology can help organizations compare data before and after implementation of specific controls, communicate results efficiently and track changes without extensive manual effort.

Integrating OSH Actions Into Existing Processes

As per Sections 6.1.4 and 6.2.2 of ISO 45001, organizations must plan how and where to integrate OSH actions into existing business processes. Traditionally, manual handling training and injury prevention activities are conducted outside of daily work processes, typically in a classroom setting. However, implementation of safety technology can provide a means of integrating manual handling training into the normal workday, in a less disruptive manner. Wearable technology used during work tasks can reduce the need for workers to leave their work to attend training.

Integration of safety technology into existing processes can often be accomplished without disrupting normal work activities and with minimal adjustments to existing processes. Workers can perform their normal tasks while simultaneously receiving training on safe manual handling practices.

Conclusion

ISO 45001 serves as a comprehensive framework for implementing an effective OHSMS to provide a safer, healthier workplace. The standard highlights the importance of promoting a culture that supports an organization's OSH goals and emphasizes active involvement and participation of workers in OSH processes. While this article primarily focuses on ISO 45001, organizations conforming to other OHSMS such as ANSI/ASSP Z10.0 can apply the use of technology to their risk management strategies.

Ergonomics is one of the many factors that organizations should consider when planning and implementing ISO 45001. If a company encounters significant ergonomic risks, it can be beneficial to employ technology such as wearable safety devices and vision processing technology to manage those risks and conform to several requirements outlined in ISO 45001. **PSJ**

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