

ARTIFICIAL INTELLIGENCE IN SAFETY PRACTICE

A Tool, Not an Authority

By James D. Fabrizio

Artificial intelligence (AI) is no longer a theoretical concept in occupational EHS; it is an active presence in the field. These tools were once limited to administrative or behind-the-scenes analytical applications.

Now, AI tools are routinely used for hazard recognition, incident trend analysis, regulatory research and decision support. As adoption accelerates, these technologies offer clear opportunities to enhance safety performance. However, the growing use of AI also introduces new professional responsibilities.

While AI can process large volumes of information rapidly, it does not replace the need for judgment, experience and contextual understanding. For safety professionals, integrating AI into daily practice heightens rather than reduces the need for technical competence and critical thinking. Ensuring that AI-generated information is accurate, relevant and appropriate for real-world conditions remains the responsibility of the safety professional using it.

AI in Contemporary Safety Practice

AI systems are increasingly embedded in tools commonly used by safety professionals, including mobile inspection platforms, learning management systems, predictive analytics software and wearable technologies. These systems can quickly analyze large datasets, identify trends in near-miss and injury records, and generate recommendations intended to support prevention efforts.

In many cases, AI improves efficiency and consistency. Tasks such as drafting job hazard analyses, reviewing safety observations and summarizing regulatory guidance can often be completed more quickly than through traditional methods. When applied thoughtfully, these capabilities can allow safety professionals to spend more time on high-value activities, including workforce engagement, coaching and leadership support.

Despite these benefits, AI should be viewed strictly as an assistive technology. It relies on algorithms and training data and does not possess situational awareness, ethical reasoning or contextual understanding qualities that are essential to effective safety practice.

Understanding the Limits of AI Outputs

AI systems generate outputs based on probabilities, data patterns and historical information. While this can be valuable, it also introduces risk when results are accepted without verification. Incomplete inputs, outdated information or flawed assumptions can lead to recommendations that appear authoritative but fail to reflect actual conditions.

Field safety work requires nuance. Two tasks may appear identical in a digital system yet involve very different hazards due to changes in environment, worker experience, equipment condition or operational constraints. AI tools cannot independently identify these variables or reliably assess their impact without human input.

Overreliance on AI outputs is a growing concern. Information presented in a confident, polished format may give the impression of accuracy even when errors or oversimplifications are present. Ultimately, the responsibility for evaluating the quality and applicability of AI-generated information rests with the safety professional.

The Ongoing Importance of Core Competencies

As AI use expands, the importance of core professional competencies becomes even more pronounced. Knowledge of regulations, hazard identification, exposure assessment, risk evaluation and control strategies remain foundational. These competencies enable safety professionals to determine whether information is credible and appropriate, regardless of its source.

This principle is illustrated by a concept often taught in industrial hygiene education. In one industrial hygiene course, a professor acknowledged that most students would not become practicing industrial hygienists and that equations, exposure limits and calculations could always be referenced in professional materials (C. Robinson, personal communication, March 2025). The more enduring lesson followed: At some point in their careers, students would need to read and rely on a technical report. Understanding how calculations were performed would allow them to judge whether the conclusions were accurate and defensible.

SMART AI USE IN EHS

- **Verify before acting.** Check AI-generated hazard analyses, summaries and recommendations against current regulations, site conditions and personal expertise before relying on them. A polished, confident answer can still be wrong.
- **Add the field context AI cannot see.** Two tasks that look the same in a digital system may carry very different hazards. Account for the environment, worker experience, equipment condition and operational limits that the tool cannot detect on its own.
- **Keep fundamentals sharp.** Keep building knowledge of regulations, exposure assessment, risk evaluation and controls. These skills are what let safety professionals spot errors, gaps and misapplications in AI outputs.
- **Write precise prompts.** Give AI tools specific details about the process, exposures and controls involved. Vague questions produce incomplete or misleading answers, so refine prompts and look for what the response leaves out.
- **Document how AI is used.** Record which tools are used, how outputs are evaluated and the why behind final decisions. Responsibility for the outcome stays with the safety professional and their organization, not the technology.
- **Build governance before scaling up.** Ensure that training, oversight and clear policies for AI use are in place. Adopting these tools without them can increase risk rather than reduce it.

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That lesson applies directly to AI use in safety practice today. AI can generate assessments, summaries and recommendations quickly, but without a strong understanding of underlying principles, safety professionals may not recognize errors, omissions or inappropriate applications. The same foundational skills that allow professionals to evaluate a technical report are required to evaluate AI outputs.

Professional expertise serves as a validation mechanism. Understanding how risk assessments are conducted, how exposure limits are derived, and how controls function in real environments allows safety professionals to question AI outputs and confirm their reliability. Without these competencies, incorrect information may go unchallenged simply because it is delivered efficiently and confidently. Rather than replacing competency, AI reinforces the need for it.

The Value of Asking the Right Questions

One critical factor influencing AI usefulness is the quality of the input provided. AI systems respond directly to how questions are framed. Vague or poorly defined prompts often result in incomplete or misleading outputs.

Experienced safety professionals are better positioned to use AI effectively because they understand processes, exposures and controls in sufficient detail to ask precise, context-specific questions. This underscores an important principle: AI amplifies existing expertise; it does not create it. Developing the ability to interact effectively with AI by refining prompts, interpreting responses and identifying gaps should be viewed as an extension of professional development within the safety profession.

Accountability & Ethical Considerations

Despite increased automation, accountability for safety decisions remains unchanged. AI-generated recommendations do not transfer responsibility from the professional to the technology. If an AI-informed decision contributes to an adverse outcome, responsibility rests with the individual and organization that relied upon it. This reality highlights the importance of transparency and documentation. Safety professionals should be prepared to explain how AI tools were used, how outputs were evaluated and why final decisions were made. Organizations that adopt AI without adequate training, governance or oversight risk increasing rather than reducing exposure.

Positioning AI as a Professional Tool

When used responsibly, AI can be an asset in proactive safety management. It can help identify emerging risks, improve access to information, and support data-driven decision-making. However, it must remain secondary to professional judgment.

The most effective safety professionals will be those who integrate AI thoughtfully, leveraging its strengths while maintaining mastery of safety fundamentals. Critical thinking, ethical responsibility, and contextual awareness remain uniquely human capabilities and are essential to preventing harm.

Conclusion

AI is now firmly embedded in field safety work. Its influence depends on how it is used. By maintaining strong technical foundations, practicing critical evaluation and treating AI as a support tool rather than an authority, safety professionals can ensure that technology enhances worker protection rather than undermining it. In a profession grounded in responsibility and trust, human judgment remains the most important control measure. **PSJ**

Disclaimer

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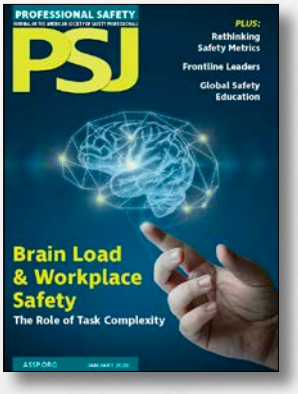
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