




Algorithmic Management in Occupational Safety and Health: Transition from Reaction to Prediction

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On the brink of the digital transformation of work environments, we are witnessing the emergence of a new paradigm in occupational safety and health. Algorithmic management, as one of the prominent achievements of Industry 5 (Fifth industrial revolution), holds the potential to fundamentally transform traditional HSE approaches. This evolution aligns with the directions of the International Labour Organization (ILO) in promoting "decent work" and "adequate protection for all workers," which form the core of the organization's theme for the upcoming year. Algorithmic management, by leveraging advanced technologies such as artificial intelligence, the Internet of Things, and big data analytics, facilitates a shift from a reactive to a predictive approach in safety management. This shift represents a fundamental move from responding to incidents after their occurrence to proactive risk anticipation and prevention, which closely aligns with the ILO's emphasis on prevention as the most effective strategy in occupational safety and health. Within the industrial context of Iran, the implementation of algorithmic management entails specific

considerations. These include addressing existing technical infrastructure, localizing algorithms in accordance with the unique conditions of Iranian industries, and ensuring alignment with the country's legal and cultural requirements. These considerations are fully consistent with the ILO's approach, which emphasizes the recognition of national contexts and the adaptation of strategies to local conditions. To achieve success along this path, adherence to principles such as the active engagement of stakeholders—including workers, managers, and HSE specialists—in system design, ensuring algorithmic transparency and the traceability of decision-making processes, observing the principles of data minimization and privacy protection, and ultimately preserving the central role of human judgment alongside algorithmic outputs is essential. These principles closely align with the ILO's emphasis on social dialogue, transparency, and respect for workers' rights. On the path to implementing this transformation, numerous challenges must be addressed, including resistance to change within organizational cultures, infrastructural constraints in traditional industries,

ethical concerns related to digital monitoring, and the need to enhance digital competencies across the workforce. Overcoming these challenges requires strong commitment and well-structured strategic planning.

Algorithmic management in occupational safety and health represents a significant opportunity to enhance HSE standards across Iran's industries and mines. Success in this endeavor requires close collaboration among all stakeholders and the development of context-specific localized strategies that, on the one hand, harness the capabilities of digital technologies and, on

the other hand, safeguard human values and uphold the dignity of workers. This approach is closely aligned with the ILO's upcoming year theme, which emphasizes "safety and health as a fundamental right at work.

This transformation is not merely an option but an inevitable necessity on the path toward the country's sustainable industrial development. Its realization requires the formulation of a national strategic framework, comprehensive infrastructure development, the implementation of pilot projects, and the empowerment of all stakeholders.