

Developing an Effective Management System for Preventing Occupational Accidents and Injuries

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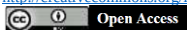
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ABSTRACT

This article examines the development of an effective management system for preventing occupational accidents and injuries at industrial enterprises. It analyses the role of hazard identification, risk assessment and control, employee training, preventive action planning, and monitoring mechanisms in ensuring occupational safety. The article also proposes a systematic approach to occupational safety management, greater accountability among managers and employees, and the use of digital technologies to identify hazards at an early stage and reduce the likelihood of occupational accidents.

Introduction

The growing complexity of production processes, the introduction of new technologies, and the increasing use of technical equipment in the workplace require a systematic approach to occupational safety. Occupational accidents not only harm employees' lives and health but also disrupt business continuity and adversely affect labour productivity and economic efficiency.

It is insufficient to attribute most occupational accidents solely to employee carelessness or non-compliance with labour discipline. In practice, accidents frequently result from a failure to identify hazards in a timely manner, inadequate workplace supervision, technological processes that do not meet safety requirements, insufficient employee knowledge and skills, and weaknesses in management.

Accordingly, the prevention of occupational injuries should not be confined to recording incidents after they occur and mitigating their consequences. It requires a preventive system based on the proactive identification and control of hazards.

The purpose of this article is to identify the principal elements of an effective management system for preventing occupational accidents and injuries and to develop practical, evidence-informed recommendations for improving that system.

MAIN BODY

Principal Causes of Occupational Accidents

Occupational accidents arise from the interaction of multiple factors. For analytical purposes, their causes may be grouped into organisational, technical, sanitary and hygienic, psychological, and human-factor categories.

Organisational causes include inadequately developed occupational safety instructions, insufficient employee training in safety procedures, weak workplace supervision, violations of work-rest schedules, and the improper allocation of duties.

Technical causes may include defects in machinery, mechanisms, and technological equipment; the absence or ineffectiveness of protective devices; and the use of equipment for purposes other than those for which it was designed.

Human factors are also an important source of occupational accidents. Risk increases when employees lack the necessary qualifications, do not understand safety requirements, perform their duties inattentively, or make decisions under the effects of fatigue, stress, or production pressure.

The presence of human error, however, does not eliminate the responsibility of the management system. An effective occupational safety system must anticipate the possibility of error and incorporate preventive safeguards so that individual mistakes do not result in serious consequences.

Core Elements of an Effective Management System

A management system designed to prevent occupational accidents should comprise several closely interrelated elements.

The first element is hazard identification. Hazardous and harmful factors at each workplace must be identified regularly. This process should cover mechanical, electrical, chemical, physical, fire, ergonomic, and other relevant hazards.

The second element is risk assessment. Identified hazards should be assessed in terms of both the likelihood of occurrence and the severity of potential consequences. This approach enables an enterprise to determine which risks must be eliminated or reduced as a matter of priority.

The third element is risk control and the implementation of preventive measures. The preferred option is to eliminate the hazard completely. Where elimination is not feasible, risk should be reduced through engineering or organisational controls, with personal protective equipment used when necessary.

The fourth element is employee preparation and training. Before starting work and throughout their employment, employees must acquire the knowledge and practical skills required for safe performance. Training should extend beyond theoretical instruction to include recognising hazards in actual work processes, responding to emergencies, and using protective equipment correctly.

The fifth element is monitoring and control. The effectiveness of the management system must be reviewed regularly. Such reviews should assess workplace conditions, compliance with safety requirements, the correction of identified deficiencies, and the state of the organisation's safety culture.

The sixth element is performance analysis and continual improvement. Every occupational accident or injury should be investigated comprehensively to identify not only its immediate cause but also its root and systemic causes. The findings should inform the development of subsequent preventive measures.

A Preventive Approach to Risk Management

A defining feature of effective occupational safety management is the priority given to prevention. Traditional approaches often investigate causes only after an accident has occurred. A modern management system instead focuses on identifying and eliminating hazardous conditions before an incident takes place.

To achieve this objective, enterprises should conduct regular safety inspections, workplace audits, and risk assessments. Employees should also be encouraged to report hazardous conditions and near misses. Such reporting provides an effective mechanism for early prevention.

Recording near misses is particularly important. Although these events do not result in injury, they reveal hazardous conditions that may lead to a serious accident in the future. Systematic analysis of near misses allows preventive action to be taken before an occupational accident occurs.

The Role of Management and Occupational Safety Culture

Management commitment is decisive in developing an effective system. Occupational safety should not be treated exclusively as the responsibility of occupational safety specialists; it must be integrated into the enterprise's overall management system.

A positive safety culture is strengthened when management allocates adequate financial and organisational resources, considers employee proposals, and demonstrates personal compliance with safe working practices.

An occupational safety culture exists when employees follow safety requirements not merely because they fear disciplinary measures, but because they recognise such requirements as essential to protecting their own lives and health. Open communication, appropriate incentives, regular training, and personal accountability among managers are essential to the development of this culture.

Opportunities Offered by Digital Technologies

Modern digital technologies create new opportunities to improve the effectiveness of occupational safety management. Electronic monitoring systems can consolidate data on identified workplace hazards, corrective action deadlines, recorded incidents, and preventive measures in a single information system.

Mobile applications can enable employees to report hazardous conditions, defective equipment, or breaches of safety requirements promptly. This improves both the collection of relevant information and the speed of the organisational response.

Sensors, automated monitoring devices, and analytical software also make it increasingly possible to track hazardous parameters in real time. In the future, these technologies may become important tools for predicting occupational accidents and identifying high-risk areas.

No single measure is sufficient to reduce occupational accidents and injuries. Effective results can be achieved only when hazard identification, risk assessment, prevention, training, monitoring, control, and continual improvement operate as a unified system.

From this perspective, occupational safety management at enterprises should follow a Plan-Do-Check-Act cycle. This approach treats safety challenges as part of a continuous management process rather than as matters to be addressed through isolated interventions.

The performance of an effective system should not be assessed solely by the number of occupational accidents recorded. A low accident count does not necessarily demonstrate that the system is functioning effectively. Leading indicators should therefore also be used, including the proportion of employees who have completed training, the coverage of risk assessments, the rate at which identified deficiencies are corrected, the number of near-miss reports, and the results of inspections.

CONCLUSION

Preventing occupational accidents and injuries requires enterprises to organise occupational safety activities systematically. The primary emphasis should be placed not on mitigating the consequences of incidents after they occur, but on identifying, assessing, and controlling hazards in advance.

Based on the analysis, the following measures are recommended for the development of an effective occupational safety management system at industrial enterprises:

- identify and assess workplace hazards regularly;
- prioritise preventive measures for high-risk work processes;
- provide occupational safety training and regularly strengthen employees' practical skills;

- introduce a system for recording near misses and hazardous conditions;
- increase the personal and organisational accountability of management for occupational safety;
- improve workplace monitoring and internal audit mechanisms;
- use digital technologies to collect and analyse risk information and to support timely management decisions; and
- make occupational safety culture an integral component of the enterprise's corporate culture.

In summary, an effective management system for preventing occupational accidents and injuries must be based on a preventive, systematic, and continuous approach. Implementing such a system protects employees' lives and health while contributing to production continuity, labour productivity, and the economic efficiency of the enterprise.

REFERENCES

1. Cabinet of Ministers of the Republic of Uzbekistan. Resolution No. 286 of 6 June 1997, approving the Regulations on the Investigation and Registration of Occupational Accidents and Other Injuries to Employees' Health Related to the Performance of Their Work Duties.
2. Cabinet of Ministers of the Republic of Uzbekistan. Resolution No. 246 of 27 April 2017, On the Approval of Regulations Governing Retraining and Advanced Training in the Field of Labour Protection.
3. Republic of Uzbekistan. Law No. ZRU-410 of 22 September 2016, On Labour Protection.
4. Republic of Uzbekistan. Law No. ZRU-174 of 10 September 2008, On Compulsory State Social Insurance against Occupational Accidents and Occupational Diseases.
5. International Organization for Standardization. ISO 45001:2018. Occupational Health and Safety Management Systems - Requirements with Guidance for Use. Geneva: ISO, 2018.
6. International Labour Organization. Safety and Health at the Heart of the Future of Work: Building on 100 Years of Experience. Geneva: ILO, 2019.
7. Reason, J. Managing the Risks of Organizational Accidents. Aldershot: Ashgate, 1997.
8. Hopkins, A. Failure to Learn: The BP Texas City Refinery Disaster. Sydney: CCH Australia, 2008.