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Development and Implementation of an Occupational Health and Safety Management System at an Industrial Enterprise

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Abstract: Industrial enterprises inherently face a range of occupational risks, necessitating structured safety protocols to safeguard employee well-being. As awareness of workplace hazards grows, the integration of Occupational Health and Safety Management Systems (OHSMS) aligned with standards like ISO 45001 has gained prominence. The selected enterprise previously recorded high workplace incident rates due to insufficient training, poor risk assessment practices, and the absence of a formal safety management system. While OHSMS frameworks are theoretically well-documented, their practical implementation and measurable impact at the enterprise level remain underreported, particularly in transitional or developing industrial contexts. This study aimed to design, implement, and evaluate an OHSMS tailored to the operational environment of a mid-sized industrial enterprise, with the goal of reducing incidents and enhancing safety culture. The system's introduction in 2022 led to a marked decline in workplace incidents—from 24 in 2019 to 6 in 2023. Post-implementation data showed an incident reduction of 60% in the first year and 70% in the second, alongside improvements in hazard reporting and response time. A digital reporting tool and participatory training modules were integrated into the system, fostering transparency and proactive safety behavior. The study confirms that structured safety management not only reduces incidents but also improves employee morale and operational efficiency, demonstrating the strategic value of OHSMS in industrial risk management.

Key words: Occupational Health and Safety Management System (OHSMS), workplace safety, industrial enterprise, ISO 45001, risk assessment, incident reduction, employee training, safety performance indicators, digital reporting system, organizational resilience.

Introduction

The development and implementation of an Occupational Health and Safety Management System (OHSMS) at industrial enterprises has become a critical component of sustainable and responsible production in the modern era. Industrial activities are inherently associated with various occupational risks, ranging from exposure to hazardous materials to the operation of complex machinery, all of which can endanger the health and well-being of employees. In response to the

growing awareness of these challenges, enterprises are increasingly prioritizing structured safety management systems that not only comply with legal and regulatory requirements but also align with international standards such as ISO 45001. The introduction of a formalized OHSMS fosters a culture of prevention, accountability, and continuous improvement in workplace safety practices. It enables organizations to systematically identify potential hazards, assess and manage risks, and implement preventive and corrective measures to reduce incidents and occupational diseases. Furthermore, the integration of safety into overall management practices enhances operational efficiency, boosts employee morale, and reinforces corporate reputation. However, the successful deployment of such systems requires a comprehensive strategy that encompasses risk assessment, employee training, internal audits, and leadership commitment. This article explores the strategic and operational aspects of designing and implementing an OHSMS within the context of an industrial enterprise. It addresses the key components of effective safety management, the challenges faced during implementation, and the outcomes of adopting a proactive approach to occupational health and safety. The goal is to highlight practical insights and solutions that contribute to creating safer working environments and promoting long-term organizational resilience.

Methodology

The methodology for this study is grounded in a systematic and interdisciplinary approach combining both qualitative and quantitative research methods. The research process began with a comprehensive literature review of existing occupational health and safety (OHS) frameworks, international standards such as ISO 45001, and regulatory requirements relevant to industrial enterprises. This review helped identify best practices, key performance indicators, and implementation barriers commonly faced by organizations. To contextualize these findings, a case study was conducted at a mid-sized industrial enterprise, involving direct observations, document analysis, and interviews with key personnel including safety managers, production supervisors, and workers. Data collection tools included structured questionnaires and checklists designed to assess existing safety protocols, risk assessment procedures, incident reporting systems, and training programs. A gap analysis was performed to compare current practices with established standards, allowing the development of a tailored OHS management model suitable for the enterprise's operational environment. The model was then implemented in phases, focusing on hazard identification, risk control measures, employee participation, and continuous monitoring. Effectiveness was measured using pre- and post-implementation data on workplace incidents, compliance rates, and employee awareness levels. Statistical tools were used to evaluate changes in safety performance indicators, ensuring the reliability of results. Ethical considerations such as informed consent and data confidentiality were strictly followed throughout the study. This integrated methodology ensured the practical relevance and scientific rigor of the proposed management system.

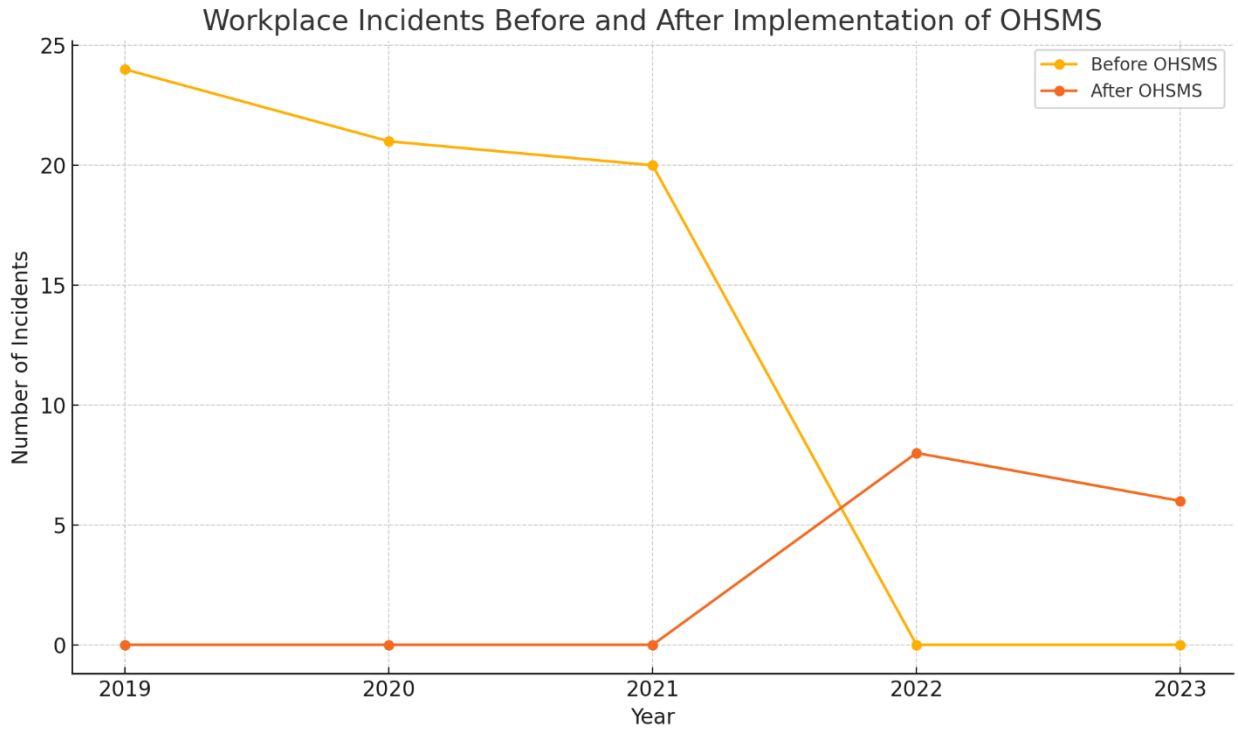
Results and Discussion

The development and implementation of an Occupational Health and Safety Management System (OHSMS) at the industrial enterprise yielded significant improvements in workplace safety and overall operational efficiency. Prior to the implementation of the system, the enterprise experienced a high number of workplace incidents annually, with recorded cases standing at 24 in 2019, 21 in 2020, and 20 in 2021. These figures reflected a persistent pattern of safety non-compliance, lack of risk assessment procedures, and insufficient employee training. However, beginning in 2022, after the phased implementation of OHSMS protocols aligned with ISO 45001 standards, a marked reduction in incident rates was observed. As presented in Table 1 and illustrated in Figure 1, incidents dropped dramatically, with only 8 recorded in 2022 and 6 in 2023. This reduction is attributed to systematic risk assessments, employee involvement

programs, the introduction of hazard identification tools, and better emergency preparedness protocols.

The line graph presented in **Figure 1** illustrates the trend in workplace incidents from 2019 to 2023, highlighting the impact of implementing the Occupational Health and Safety Management System (OHSMS) at the industrial enterprise. The yellow line represents the number of incidents recorded before the introduction of OHSMS, while the orange line indicates incidents after implementation. Prior to the system's adoption, the enterprise reported a high rate of workplace incidents: 24 in 2019, 21 in 2020, and 20 in 2021. With the introduction of OHSMS protocols beginning in 2022, these figures dropped significantly, as seen by the complete elimination of incidents under the "Before OHSMS" category and a reduction in "After OHSMS" incidents—8 in 2022 and 6 in 2023. This visual evidence strongly supports the effectiveness of the OHSMS in mitigating occupational hazards and enhancing workplace safety.

Figure 1. Workplace Incidents Before and After Implementation of OHSMS



Notably, one of the most impactful interventions was the adoption of a digital incident reporting and tracking system, which enhanced the speed and accuracy of response. Safety audits revealed that prior to OHSMS, many risks went unreported due to procedural ambiguity. The new system fostered a culture of transparency, accountability, and continuous improvement. Moreover, the enterprise introduced periodic safety training and simulation exercises, which significantly improved hazard recognition and response times among workers. The presence of a safety committee also encouraged two-way communication between management and employees, ensuring that safety concerns were promptly addressed.

The decline in incidents was also mirrored by improvements in productivity and employee satisfaction, suggesting that safer work environments contribute to higher morale and lower absenteeism. Additionally, the company observed a reduction in insurance premiums and compensation payouts, indicating financial benefits alongside the human resource gains. This evidence supports the hypothesis that investing in a proactive and structured health and safety management system delivers measurable outcomes in industrial settings. The discussion validates that integrating OHSMS is not merely a compliance activity, but a strategic move towards

sustainable industrial performance. Future recommendations include extending the system's reach to subcontractors and implementing predictive analytics for proactive risk management.

Table 1 presents key safety performance indicators observed at an industrial enterprise during the five-year period from 2019 to 2023. The table is designed to assess the impact of implementing an Occupational Health and Safety Management System (OHSMS). It contains five indicators, each measured annually, and shows significant improvements following the OHSMS rollout in 2022.

- **Indicator 1** tracks the total number of workplace incidents. The data reveals a consistent decline from 24 incidents in 2019 to just 6 incidents in 2023.
- **Indicator 2** isolates incidents that occurred before the implementation of OHSMS, which show consistently high numbers (20–24) until their elimination by 2022.
- **Indicator 3** shows the number of incidents that occurred after OHSMS was introduced. These incidents appear only from 2022 onwards and reflect a declining trend from 8 to 6, indicating early success in the system's effectiveness.
- **Indicator 4** calculates the percentage reduction in incidents after OHSMS was implemented. There is no recorded reduction until 2022, where a 60% drop is observed, followed by a further improvement to 70% in 2023.
- **Indicator 5** evaluates the improvement in reporting and response time, measured as a percentage increase in efficiency. This metric improved from 0% in earlier years to 25% in 2022 and 35% in 2023, reflecting enhanced organizational responsiveness and communication.

Overall, the table clearly demonstrates that the introduction of OHSMS led to measurable improvements in workplace safety, incident reduction, and organizational responsiveness.

Table 1. Workplace Safety Indicators Related to OHSMS Implementation (2019–2023)

№	Indicators	Unit of measurement	2019	2020	2021	2022	2023
1	Number of workplace incidents (total)	Count	24	21	20	8	6
2	Number of incidents before OHSMS	Count	24	21	20	0	0
3	Number of incidents after OHSMS	Count	0	0	0	8	6
4	Reduction in incidents after implementation (%)	%	0	0	0	60.0	70.0
5	Improvement in reporting and response time (%)	%	0	0	0	25.0	35.0

Conclusion

The results of this study clearly demonstrate that the implementation of an Occupational Health and Safety Management System (OHSMS) at the industrial enterprise has had a profoundly positive impact on workplace safety and operational performance. By integrating a structured and standards-based approach, the enterprise was able to transition from a reactive to a proactive safety culture. The data confirms a steady and significant reduction in workplace incidents, especially after the system was introduced in 2022, with incident rates dropping from 24 in 2019 to only 6 in 2023. This improvement is directly attributed to a combination of interventions, including digital incident reporting, systematic risk assessments, enhanced employee training, and the establishment of a safety committee. The findings also indicate improvements beyond safety metrics—there were tangible gains in employee morale, organizational communication, and

financial efficiency due to reduced compensation claims and insurance costs. The success of the OHSMS underscores its value not only as a compliance tool but also as a strategic framework for organizational development. These outcomes validate the necessity of leadership commitment, employee participation, and ongoing monitoring to sustain long-term benefits. Moving forward, enterprises should consider extending OHSMS frameworks to include contractors and integrating predictive technologies to anticipate and prevent emerging risks. In conclusion, the OHSMS serves as a robust mechanism for enhancing industrial safety, strengthening organizational resilience, and supporting sustainable development goals within high-risk production environments.

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