
Adapting an OHS Management System to ISO 45001 Requirements: Ensuring System Management Effectiveness

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Abstract:

Purpose: In the end of a transition period, companies face the need to adjust their existing health and safety management systems to compliance with the ISO 45001 standard. Such compliance is deemed necessary for the effective rollout of a system that will ensure occupational safety. The aim of this study is to adapt the existing solutions for compliance with ISO 45001.

Design/Methodology/Approach: The paper relies on the case of two manufacturing companies, for which compliance levels and the nature of any non-compliances have been assessed and for which vital improvement measures have been identified. Issues arising in connection with an assessment of the effectiveness of systemic management are examined. In assessing the solutions in place, the assumption is made that effective improvements are critical for the benefits to be derived from the operation of the resulting OHS system.

Findings: A literature review has shown that for occupational safety to be managed effectively, it is crucial to resolve all irregularities promptly by means of effective improvement measures. A relevant principle is applied to identify issues and select appropriate improvements. The measures that effectively improve the system in place are instrumental.

Practical implications: The study addresses the activities that are pivotal for effective occupational safety management and, specifically, for the safety management system to produce the desired effects.

Originality/Value: The study finds which non-conformities prevent organizations from improving their occupational health and safety management systems in accordance with ISO 45001 guidelines. Once organization recognize the needs for improvement that have been identified, they can view their occupational safety management as part of their company-wide management system. This has the effect of making their performance more effective.

Keywords: Systemic management, ISO 45001, work environment, occupational safety.

JEL codes: D21, J24, J28, J53, J62.

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1. Introduction

The release of the ISO 45001:2018 standard has obligated enterprises to apply a process approach in their systemic occupational safety management. To adapt systems to OHSAS 18001 as well as to any relevant national standards, companies need to define the scope of the changes that are necessary to comply with the latest requirements.

To ensure the improvements are effective, organizations should identify any nonconformities and take appropriate improvement measures. This will determine the choice of the preventive and protective measures that are needed to eliminate hazards and/or mitigate risks (Skład, 2019). Such measures require the engagement of company leadership to guide workers (Bottomley, 1999). The involvement of top management is essential for achieving the intended improvement outcomes. Part of the result are safety culture modifications spanning the entire organization (Ewertowski, 2019) and well-establishment safety standards (Dahlke, 2015).

It is critical during the assessment process to bear in mind that system effectiveness is predicated on a global approach to safety (Górny, 2018; Marczevska-Kuźma, 2021). One is warned not to limit the effort to selected aspects of the assessment only.

2. Worker Safety According to Systemic Management Guidelines

Occupational health and safety refers to the needs and conditions to be satisfied to ensure a proper functioning in the work environment (Dahlke, 2015). Regardless of any assertions that put into question the advisability of deploying systemic management (Bennett, 2002; Granerud and Rocha, 2011), the desired outcomes can only be secured by focusing on vital problems with improvements of the working environment. The effort is both challenging and complex (Robson *et al.*, 2007), especially that the effectiveness of the entire system depends on the successful rollout of its individual components (Ewertowski and Kubicka, 2020). This means that the functioning of the system in place will only be as good as that of its individual elements (Bottani *et al.*, 2009; Mohammadfam *et al.*, 2017).

Therefore, in implementing the system, due attention needs to be paid to its individual components while recognizing the interdependencies of the overall system. For the occupational management system to work effectively, organizations need to define the common goal, estimate the resources necessary to ensure its operation and the achievement of objectives, and monitor the outcomes of any measures. Any actions taken to improve safety must be linked to the organization's processes and ensure the continuity of performance.

By taking proper account of the conditions in which they conduct their business, organizations are enabled to manage occupational health and safety while

continuously improving their operations. In approaching OHS systemically, it is critical to recognize that every decision one makes will have an impact on the organization's performance and functioning.

Businesses should view improvements to OSH management systems as a way to raise worker awareness, understanding and commitment and boost their motivation (SMS, 2019). The above is particularly relevant to health and safety policies, which include a commitment to ensure safe working conditions (Górny, 2015). By regularly identifying hazards, assessing risks and reviewing control measures, enterprises gain the capacity to ensure the required level of safety for their employees accordingly to all pertinent factors in the working environment, including those that affect working comfort (Dahler-Larsen *et al.*, 2020; Rocha, 2010; Górny and Sadłowska-Wrzesińska, 2016). It is therefore central to ensure the efficient implementation of systemic activities relating to system performance and the achievement of outcomes (Górny, 2018).

By adopting systemic OSH management guidelines, organizations should gain the capacity to effectively eliminate the causes of any disruptions that result from inadequate solutions. To achieve effectiveness, they need to understand systemic management in all of its aspects and embrace solutions that will improve their performance. Proper audit procedures and management reviews must be put in place to address such issues.

3. Solutions Employed to Ensure Measure Effectiveness

Once it has been rolled out, an organization's health and safety management system should be continuously monitored for irregularities so as to prompt corrective measures as needed. Adequate checks of the solutions in place are essential for the effective performance of health and safety management systems and for flagging needs for improvement (Górny, 2018). Such checks involve monitoring, measurements, analyses and evaluations of measure outcomes as well as internal audits and management reviews.

Monitoring, measurements and analyses may concern either production-floor events or the effectiveness of supervisory measures. Monitoring can be defined as the surveillance of working conditions (SMS, 2019). The term refers to the continuous supervision, checks and reviews of documentary information and the observation of work performance. Measurements are a key part of quantitative data evaluation (e.g., measurements of exposures to hazardous substances). Analysis, in turn, refers to the examination of data to identify relationships. Measure outcome assessments should verify the achievement of the objectives that the system is expected to meet (Tremblay and Badri, 2018). In assessing solution effectiveness, organizations should examine all disturbance factors and employ means that will adequately prevent their recurrence (ISO 45001).

A health and safety audit will identify any irregularities and help gauge the effectiveness of the solutions in place. In planning their audits, organizations should account for (Bigelow and Robson, 2005):

- Changes in any requirements affecting the performance of work and their impact on an organization's performance,
- The complexity and maturity of the existing system,
- The option to involve independent auditors.

A management system review is conducted by company leaders to ensure that the existing system is adequate, effective and fit for purpose. Adequacy may well be equated with proper implementation. Effectiveness determines success in achieving desired outcomes, while fitness for purpose refers to adapting an OSH management system to comply with the principles that govern an organization's performance. Any management system review should account for:

- Changes in external and internal factors affecting a company's performance,
- Opportunities to ensure continuous improvement,
- Information on the outcomes of measures taken, including incidents, non-conformities, improvements, and the findings of monitoring, measurements and audits.

The requirements that need to be met to ensure compliance and enhance management system effectiveness are given in Table 1. By satisfying such requirements, the organization will achieve compliance with ISO 45001. Note that the scope of these requirements has not changed from OHSAS 18001. The only modifications to be made pertain to the guidelines for their implementation.

Table 1. Organizations' responsibilities for assessing existing management systems, as defined in ISO 45001

Requirement	Responsibilities pertaining to measures required systemically
9.1 Monitoring, measurement, analysis and performance evaluation	Organizations are required to: <ul style="list-style-type: none"> - Define the scope of monitoring (including legal and other requirements, actions taken to address hazards and risks and take advantage of opportunities) and rules to be observed to achieve the adopted goals, - Define methods of monitoring, measurement, analysis and performance evaluation, - Define performance assessment criteria, - Set deadlines for monitoring, measurement, evaluation and analysis and for notifying concerned parties of action outcomes, - Ensure that any equipment used is calibrated and verified and that it is used and maintained correctly, - Store documentary information on monitoring, measurement, analysis findings and performance evaluation, - Store documentary information on the calibration or verifications of

Table 1. (continuation)

Requirement	Responsibilities pertaining to measures required systemically
	measuring devices, - Implement and maintain any processes designed to ensure the compliance of all measures with legal and other requirements, - Carry out all activities as formal processes.
9.2. Internal audit	Organizations are required to: - Define audit criteria and scope to ensure they produce sufficient information to determine whether the concerned system is properly deployed and maintained, - Plan audits accordingly to the processes to be reviewed and in view of the findings of previous audits, - Conduct audits in accordance with the adopted audit program that defines planning and reporting methods, responsibilities and requirements, - Conduct internal audits at scheduled intervals while ensuring their objectivity and impartiality, - Ensure that audit findings are properly communicated to all concerned parties, including those responsible for the areas that fall within the scope of the audit, - Store documentary information as evidence of the proper completion of audits, - Effectively eliminate nonconformities and ensure continuous improvement.
9.3 Management review (Management assessment)	Organizations are required to: - Carry out a management review to assess and confirm the fitness for purpose, adequacy and effectiveness of the deployed management system, - Define the degree to which the health and safety policy has been implemented and the adopted goals achieved, - Obtain information on the effects of the corrective measures that follow continuous improvement guidelines, - Check the availability of the resources required to maintain the management system, - Check the effectiveness of communication with the concerned parties, - Consider the need to make changes to ensure continuous improvement, accommodate the needs and expectations of all concerned parties, as per legal and other requirements and in accordance with any identified risks and opportunities, - Ensure that output data will be helpful in identifying the needs and opportunities for continuous improvement and system integration with other business processes, - Ensure that the concerned parties (including the workers and/or their representatives) are given access to the review findings, - Ensure that documentary information from the review is properly stored and available as evidence of its completion.

Source: Own research based on ISO 45001.

4. Evaluation of Solutions in Place and Improvement Needs

The compliance of the rollout of an occupational health and safety management system with ISO 45001 guidelines and its responsiveness to needs for improvement was verified in two large manufacturing companies with an existing OHS management system. The priority for the two enterprises is to take measures that will ensure tangible benefits and help them satisfy their customers. By adopting management systems, they were able to reduce occupational accident rates and near misses and the prevalence of occupational diseases. By choosing the latest technology, they were able better to protect the environment while enhancing worker and customer safety.

Enterprise A has more than a hundred years of experience. It makes low- and high-voltage, medium- and high-power electrical machines. It also designs and maintains the equipment it manufactures. The company has adopted a health and safety management system compliant with the PN-N-18001 standard. In January 2018, the system was integrated with both quality and environmental management.

Company B, established in 1967, is in the business of steel processing, which includes steel machining, welding, laser and plasma-gas cutting, metal sheet coiling and bending, as well as surface painting and shot blasting. The company has put in place a health and safety management system compliant with the PN-N-18001 standard.

In 2011, this safety management system was linked with its environmental management system. The companies' improvement needs were identified by their employees responsible for relevant matters and involved in ensuring compliance with ISO 45001 requirements. In the course of the assessment, each of them made the determination of whether the solutions were:

- F: fully-compliant with ISO 45001,
- Q: quasi-compliant with ISO 45001 – improvement needed,
- N: non-compliant with ISO 45001 – modifications needed.

In the case of discrepancies among them, the assessors would engage in a discussion to arrive at one comprehensive conclusion. The discussion was held in the presence of an external expert in systemic health and safety management requirements. The assessment extended to:

- Point 9.1.1 of EN 45001: Monitoring, measurement, analysis and performance evaluation / General,
- Point 9.1.2 of EN 45001: Evaluation of compliance,
- Point 9.2.1 of EN 45001: Internal audit / General,
- Point 9.2.2 of EN 45001: Internal audit program,
- Point 9.3 of EN 45001: Management review.

The findings of the assessment and the relevant ISO 45001 requirements are shown in Table 2.

Table 2. Findings of assessments of compliance with the ISO 45001 standard in Companies A and B.

Requirement reference	Issue assessed	Company	
		A	B
9.1.1	-Rules for assessing the efficiency and effectiveness of OHS management system in place have been adopted,	F	F
	-Processes for monitoring, analysis, measurement and evaluation of measure effectiveness have been adopted, deployed and maintained,	F	Q
	-Methods for monitoring, measurement, analysis and evaluation have been defined to obtain a clear picture of activities,	F	Q
	- Clear criteria have been defined that the organization uses to check measure outcomes,	F	Q
	-A schedule is in place for monitoring and measuring process performance,	F	Q
	-Conditions have been defined that trigger the need to monitor, analyze, evaluate and measure activities,	F	Q
	-Rules have been adopted for assessing the effectiveness of the management system in place,	F	F
	-Duly assessed and calibrated measuring equipment has been deployed, its proper use and maintenance ensured,	F	F
	-Access has been granted to information confirming the monitoring, measurement, analysis and evaluation of processes effectiveness and the maintenance and calibration of measuring equipment	F	Q
9.1.2	-Solutions ensuring compliance with applicable requirements have been put in place and maintained	F	F
	-Assessment frequency and methodology has been considered in planning the assessment	F	F
	-Improvement measures have been recognized as necessary	F	F
	-An effort has been made to acquire and understand necessary knowledge has been made and properly overseen	F	F
	-Formal rules have been adopted for storing documentary information that shows how the measures have been deployed; such rules are being followed	F	F
9.2.1	-Internal audits are carried out to check compliance with the policy in place and with the aims and requirements of the standard	F	F
	-Audits are performed to check if the management system is effectively rolled out and maintained	F	F
9.2.2	-Audits are planned, conducted and maintained accordingly to the findings of previous audits	F	F
	-The scope and verification criteria have been defined for the areas to be audited	F	F

Table 2. (continuation)

Requirement reference	Issue assessed	Company	
		A	B
	-Audits are conducted in an objective and impartial manner	F	F
	-Audit findings are communicated to all concerned parties	F	F
	-Measures are taken to resolve any identified non-conformities and improve the auditing program	F	F
	-The information produced is documented to confirm that audits have been conducted and show possible improvements	F	F
9.3	-A management review is carried out as planned based on the findings of the previous review	N	N
	-The management review relates to the adopted security policy and objectives	F	F
	-The review considers applicable requirements, including legal requirements and the needs and expectations of the concerned parties	Q	Q
	-The review considers all information determining the functioning of the management system in place	Q	Q
	-The review considers the availability and adequacy of resources employed to ensure system effectiveness	F	F
	-The review considers the effectiveness of the communication with the concerned parties	F	F
	-The review findings are considered when identifying the improvement measures needed to achieve the desired improvement outcomes	F	F
	-The review considers the option of ensuring continuous improvement	Q	N
	-Review findings are applied to ensure continuous improvement	Q	N
	-The review findings are used to point out the need for changes in the system in place	Q	Q
	-The review findings are used to point out the need for improvement measures	Q	Q
	-The review findings are used to point out the need for allocate resources to system improvement	F	F
	-The review findings are used to point out the need for integrating the OSH management system with other business processes	F	F
	-The review findings are used to point out opportunities for strategic development of organization	Q	Q
	-The review findings are communicated to employees and their representatives in a clear and understandable manner	F	F
-The review findings are documented to demonstrate proper management of health and safety	F	F	

Source: Own research based on ISO 45001.

Figure 1. Chart showing the findings of the assessment of compliance with ISO 45001 guidelines.



Source: Own research.

5. Concluding Remarks

The assessment demonstrated the need for changes to improve the effectiveness of the OHS management system in place and bring it into compliance with ISO 45001 requirements. The case study showed it was necessary to include the following within the scope of improvement measures:

- Monitoring, analysis and evaluation of system activities,
- A management review providing the information needed to improve system performance and identify improvement opportunities.

The needs for improvement are particularly evident in Company B. However, both companies need their top management to examine and follow the systemic management guidelines given in ISO 45001 and applicable laws. In particular, improvement measures are required to:

- Boost the effectiveness of monitoring, analysis, measurement and evaluation of the performance and outcomes of measures focused on ensuring the use of appropriate solutions, the setting of a clear schedule, granting access to information and adopting a proper performance methodology,
- Plan reviews and follow specific review-governing rules,
- Ensure that improvement measures are based on review findings and used for effective continuous improvements and the strategic development of the enterprise.

Systemic measure improvements should be recognized as vital for ensuring an effective health and safety management system. Such improvement measures generate essential information that provides an updated picture of hazards to system performance. Once such information is secured and properly applied, the concerned organization gains the capacity to make improvements that reduce the incidence of circumstances that adversely impact and burden enterprises.

References:

- Bennett, D. 2002. Health and safety management systems: liability or asset? *Journal of Public Health Policy*, 23(2), 153-171.
- Bottomley, B. 1999. *Occupational Health and Safety Management Systems: Strategic Issues*. National Occupational Health and Safety Commission, Sydney.
- Bigelow, P., Robson, L.S. 2005. Occupational health and safety management audit instruments: a literature review. *Systematic Review*, Institute for Work & Health, Toronto.
- Bottani, E., Monica, L., Vignali, G. 2009. Safety management systems: performance differences between adopters and non-adopters. *Safety Science*, 47, 155-162.
- Crawley, F. 2020. *A Guide to Hazard Identification Methods*. Elsevier, Amsterdam.
- Dahler-Larsen, P., Sundby, A., Boodhoo, A. 2020. Can occupational health and safety management systems address psychosocial risk factors? An empirical study. *Safety Science*, 130, 104878.
- Dahlke, G. 2015. Ergonomic criteria in the investigation of indirect causes of accidents. *Procedia Manufacturing*, 3, 4868-4875.
- Ewertowski, T. 2019. Just culture as a useful tool for the organizations in the context of ISO 45001:2018 standard implementation. In: Pacholski L., et al. (Eds), *Human Factors in Contemporary Organizations*, 95-103. DEStech Publications, Lancaster.
- Ewertowski, T., Kubicka, K. 2020. Impact of occupational health and safety management system on the performance of occupational health and safety in a selected construction company - A Case Study. *Proceedings of the 36th International Business Information Management Association Conference*, 4-5 November. Granada, Spain, IBIMA Publishing.
- Górny, A. 2015. Occupational health and safety management in the international condition consistent with objectives the ISO 45001 standard. *Modern Management Review*, XX (22/4), 73-88.
- Górny, A. 2018. Safety in ensuring the quality of production –The role and tasks of standards requirements. *MATEC Web of Conferences*, 83, 01005.
- Górny, A., Sadłowska-Wrzesińska, J. 2016. Ergonomics aspects in occupational risk management. Arezes P., et al. (Eds.), *Occupational Safety and Hygiene, SHO*, 102-104. Portuguese Society of Occupational Safety and Hygiene, Guimarães.
- Granerud, L., Rocha, R. 2011. Organisational learning and continuous improvement of health and safety in certified manufacturers. *Safety Science*, 49, 1030-1039.
- ISO 45001:2018 (PN-ISO 45001:2018-06). *Occupational health and safety management systems. Requirements with guidance for use*, PKN, Warsaw.
- Marczewska-Kuzma, R. 2021. Correlation Approach in Defining Organizational Health and Safety Management Strategies. *European Research Studies Journal*, 24(2B), 904-914.
- Mohammadfam, I., Kamalinia, M., Momeni, M., Golmohammadi, R., Hamidi, Y., Soltanian, A. 2017. Evaluation of the quality of occupational health and safety management systems based on key performance indicators in certified organizations. *Safety and Health at Work*, 8, 156-161.
- Robson, L, Clarke, J., Cullen, K., Bielecky, A., Severin, C., Bigelow, P., Irvin, E., Culyer, A., Mahood, Q. 2007. The effectiveness of occupational health and safety management systems: a systematic review. *Safety Science*, 45, 329-353.
- Rocha, R. 2010. Institutional effects on occupational health and safety management systems. *Human Factors and Ergonomics in Manufacturing & Service Industries*, 20, 211-225.

- Skład, A. 2019. Assessing the impact of processes on the Occupational Safety and Health Management System's effectiveness using the fuzzy cognitive maps approach. *Safety Science*, 117, 71-80.
- SMS, 2019. Safety Management System (SMS), Evaluation Tool (Version 2). Safety Management International Collaboration Group (SM ICG).
- Tremblay, A., Badri, A. 2018. Assessment of occupational health and safety performance evaluation tools: State of the art and challenges for small and medium-sized enterprises. *Safety Science*, 101, 260-267.