Environmental Engineering and Management Journal

November 2018, Vol.17, No. 11, 2711-2718
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

"Gheorghe Asachi" Technical University of Iasi, Romania

CONSIDERATIONS ON IMPROVING OCCUPATIONAL HEALTH AND SAFETY PERFORMANCE IN COMPANIES USING ISO 45001 STANDARD

Doru Costin Darabont[1], Costica Bejinariu[2], Iulian Ionita[2], Mihai-Adrian Bernevig-Sava[2], Constantin Baciu[2]*, Elena-Raluca Baciu[3]

[1]National Research and Development Institute on Occupational Safety-INCDPM "Alexandru Darabont" Bucharest, 35A Ghencea Blvd., Bucharest, Romania
[2]"Gheorghe Asachi" Technical University of Iasi, 67 Dimitrie Mangeron Blvd, Iasi, Romania
[3]"Grigore T. Popa" University of Medicine and Pharmacy, 16 Universitatii Str. Iasi, Romania

Abstract

Occupational health and safety (OHS) is one of the most important problem of a company because each manager should consider the workers as the most valuable resource of the enterprise. This issue is all the more important as in the last decades, the types of OHS risks have changed due to technological, social and economic advances, and companies should use new approaches and instruments to control and manage these risks.
The paper focuses on the application of OHS management system as an important instrument for managers to ensure healthy workplaces for all workers, addressing not only OHS management but also quality management, environmental management and social responsibility issues in an integrated context. The results are represented by practical instruments that any organization should use to assess its OHS performance. Also, the theoretical and practical aspects presented here could be easily integrated in the existing or new designed procedures of the company.

Key words: audit, management systems, new and emerging risks, occupational health and safety, risk assessment

Received: May, 2018; Revised final: November, 2018; Accepted: December, 2018; Published in final edited form: November 2018

1. Introduction

Considering the workers as the most valuable resource of the company, each employer should pay a special attention to OHS issues. Technological, social and economic advances have determined new types of OHS risks, requiring companies to adopt new approaches and new instruments to control these risks (Tomescu et al., 2017). According to definition (Babut et al., 2011; Houtman et al., 2018), a risk is new if:

- the risk is totally new and is determined by new forms of technologies or organizations;

or

- a long-standing issue is newly considered to be a risk due to changes in social or public perceptions;

or

- new scientific knowledge allows a long-standing issue to be identified as a risk.

A risk is considered to be a new one if:

- the number of hazards leading to the risk is growing; or
- the likelihood of exposure to the hazard leading to the risk is increasing; or
- the effect of the hazard on the worker's health is getting worse (seriousness of health effects and/or the number of people affected).

* Author to whom all correspondence should be addressed: E-mail: constantin_baciu@yahoo.com; Phone: + 40 729969619; Fax: +40 232225986

Release of the new standard ISO 45001 (2018) represents the last step in a long evolution process of integrated management systems (quality, environmental and occupational health and safety). This evolution process started in the fifth decade of 20th century with narrow applicability standards for quality issues, e.g. military domain, and continuing with the ISO standards 9001 and 14001 for quality and environmental management, respectively. (Bejinariu et al., 2017a; Darabont, 2010; Darabont et al., 2017a).

The environmental management standards had a similar evolution, amplified as an effect of the United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro, in 3-14 June 1992, with the participation on 172 states, having as main themes environment and sustainable development. Starting from regional and national standards, the approach has evolved to the ISO 14001 standard, with its latest edition in 2015 (Darabont et al., 2017a).

The implementation of new ISO 45001 standard – published in March 2018 (ISO 45001, 2018) – should be a smooth process for the companies which are already familiar with OHSAS 18001. However, special attention should be paid to new and emerging risk issues such as psycho-social risks, ageing workforce, workforce migration, new technologies and other specific risks related to the production process, as well as the selection of optimal risk assessment and audit methods (Babut et al., 2011; Bejinariu et al., 2017b; Darabont et al., 2017b; Ivascu and Cioca, 2014; Mihai-Adrian et al., 2017; Moraru et al., 2013; Moraru et al., 2014).

2. Overview of ISO 45001

ISO 45001:2018 "Occupational health and safety management systems – Requirements with guidance for use" is intended to provide support for all organizations in their effort to provide healthy and safe workplaces, to preserve the wellbeing of their workers and to prevent work accidents and ill-health (ISO/DIS 45001, 2018). The standard is based on Annex SL – the new ISO high level structure (HLS) that brings a common framework to all management systems. The main advantage of this approach is that it can be easily integrated into management system standards, such as quality, environment and social responsibility. The structure of ISO 45001 is presented in Table 1.

Table 1. Structure of ISO 45001

No.	***Chapter***
1	Scope
2	Normative references
3	Terms and definitions
4	Context of the organization
5	Leadership and worker participation
6	Planning
7	Support
8	Operation
9	Performance evaluation
10	Improvement

2.1. Context of the organization

The standard requires the organization to address the following issues:

- understanding the organization and its context, and
- understanding the needs and expectations of workers and other interested parties.

To determine and to understand the context of the organization, the ISO 45001 standard recommends that companies address both internal and external context issues, such as cultural, social, political, and legal aspects, the introduction of new competitors, contractors, suppliers, partners and providers, new technologies, culture in the organization, form and extent of contractual relationship, working time arrangements etc. (Bao et al., 2017; Gaman et al., 2012; Ferreira and Santos Baptista, 2013; Vasilescu et al., 2012).

The stakeholders whose expectations should be taken into consideration include stakeholders, authorities, parent organizations, suppliers, contractor, trade unions and employers' organizations. The scope of the OH&S management system should be based on a detailed analysis of the organization's context and expectations of workers and other interested parties. The main instruments that should be used to perform this analysis are the following:

- meetings with each interested party in order to document their needs and expectations;
- review of the legal requirements which are relevant for organization, as well as of other requirements, such as contractual clauses or other stakeholders requirements;
- reviewing the good work practices, in order to adopt the relevant ones;
- internal audits for evaluation of compliance with legal and other requirements, including the requirements of other stakeholders;
- consultation with OH&S experts and authorities.

The results of implementation of the above mentioned instruments should be used to define the scope of the OH&S management system.

2.2. Leadership and worker participation

First of all, top management has to demonstrate leadership and commitment with respect to the OH&S management system. The management should demonstrate leadership and commitment by giving a positive example in observing the OHS rules, giving feedback to workers on OHS issues, performing workplaces inspections and formal/informal debate with workers on OHS themes. Then, top management has to promote the idea that everybody in the company, from top management to workers, has an active role in the OHS management system, and the effort of all members should be synergic.

In this phase, the management should provide a tailored training course for each management level and for workers and should involve the OHS

Committee, workers OHS representatives and internal/external preventive and protective service(s).

2.3. Planning

Within the planning arrangements described by the standard, the organization shall determine and manage the risks and opportunities related to the operation of its OH&S management system. Examples of opportunities to improve OHS performance are:
- reducing or eliminate the monotonous work or work at a pre-determined work rate;
- introducing or improving controls such as permit to work with fire, at height or in confined space;
- incident or nonconformity investigations and corrective actions.

The organization shall establish a process for a proactive identification of hazards and a suitable assessment of risks. Another obligation for the organization is to determine and to consider all applicable legal requirements and other requirements. Also, the organization shall establish OH&S objectives and planning to achieve these objectives.

2.4. Support

According to the Standard requirements, suitable measures shall be identified and adopted by the organization to ensure the resources, competencies, awareness, information and communication required for a proper functioning of the OH&S management system.

Examples of resources include human, natural, infrastructure, technology and financial (ISO 45001, 2018). When determining the competence for each role, the organization should consider things such as:
- the education, training, qualification and experience required for workers;
- the preventive measured and controls implemented; legal requirements and other requirements to which organization subscribes;
- the duties and responsibilities associated with the roles.

Also, the required documented information shall be identified and suitable measures to control the documented information shall be implemented by the organization.

2.5. Operation

The Standard provides specific requirements for the following's aspects: operational planning and control, management of change, outsourcing, procurement, contractors as well as emergency preparedness and response. The main instruments that could be used in this phase, additionally to the requirements in the Standard, are the following (Darabont et al., 2017a):

- trainings to ensure the competence of workers, to update their competence as a part of management of change or to raise the response capacity of workers in case of emergency situations;
- internal audits focused on the compliance with preventive regulations and manufacturer's instructions provided for equipment;
- internal/external audits focused on compliance with the safety essential requirements for machinery;
- checklists and questionnaires on OHS issues for suppliers and contractors.

2.6. Performance evaluation

The Standard requires the organization to establish, to implement and to maintain a process for monitoring, measurement and evaluation. The most important element of this process is represented by the evaluation of compliance with legal requirements and other requirements which the organization subscribes to. The process of monitoring, measurement and evaluation should address, for example (ISO 45001, 2018):
- complaints on OHS domain;
- work-related incidents, injuries and ill-health;
- the status of identified gaps in compliance with requirements;
- collective agreements.

Another requirement for the organization is to plan, to establish, to implement and to maintain an internal audit program in order to provide information on whether the OH&S management system conforms to the organization's own requirements and Standard requirements as well as whether it is effectively implemented and maintained. The main requirement of the Standard addressed to the top management is to review the organization's OH&S management system periodically to ensure its adequacy and effectiveness.

2.7. Improvement

The Standard requires the organization to establish, to implement and to maintain a process to manage incidents and nonconformity as well as to take the necessary corrective actions. Also, an essential characteristic of the OH&S management systems of which organization should demonstrate is the continuous improvement.

3. Results and discussion

The results of the study consist in a high-level checklist which could be used to assess the implementation of the ISO 45001 standard requirements, and a software instrument that could be used as a support for the assessment process.

3.1. High-level checklist to assess the implementation of ISO 45001 requirements

The high-level checklist, presented in Table 2 contains items referring to the requirements of ISO 45001 standard and could be used to assess the implemented OH&S management system.

Table 2. High-level checklist for assessing the implementation of ISO 45001 requirements

No.	*Item*	*Assessment*		
		No (0 pts)	*Partially (1 pt)*	*Yes (2 pts)*
	1. Context of the organization			
1	All relevant issues in relation to organization‘s OH&S management system were determined.	☐	☐	☐
2	All relevant interested parties in relation with organization‘s OH&S management system were determined.	☐	☐	☐
3	The relevant needs and expectation of workers and of other interested parties were identified.	☐	☐	☐
4	The scope of the OH&S management system was determined and documented.	☐	☐	☐
5	The OH&S management system is established, implemented, maintained and continually improved.	☐	☐	☐
	2. Leadership and worker participation			
6	Top management demonstrates leadership and commitment regarding OH&S management system.	☐	☐	☐
7	Top management has established, implemented and maintain an OH&S policy.	☐	☐	☐
8	The OH&S policy is documented, communicated, available to interested parties and periodically reviewed.	☐	☐	☐
9	Roles, responsibilities, accountabilities and authorities for OH&S management system were established, documented and communicated.	☐	☐	☐
10	The process for participation and consultation in relation with OH&S management system was established, implemented and is maintained.	☐	☐	☐
	3.Planning			
11	The organization has assessed the risks and identified the opportunities that are relevant for its OH&S management system and documented information is maintained.	☐	☐	☐
12	A suitable process for hazard identification has been established, implemented and is maintained.	☐	☐	☐
13	The relevant legal requirements and other requirements were identified, are accessible and updated.	☐	☐	☐
14	The organization has planned actions to address the risk and opportunities, legal requirements and other requirements, as well as emergency situations.	☐	☐	☐
15	OH&S objectives and plans to achieve them were established.	☐	☐	☐
16	Documented information on OH&S objectives and related plans are maintained.	☐	☐	☐
	4. Support			
17	All the resources needed for the OH&S management system were determined and provided.	☐	☐	☐
18	The necessary competence was ensured and documented information is available.	☐	☐	☐
19	Workers are aware of relevant issues concerning OH&S management system	☐	☐	☐
20	The appropriate measures for information and communication concerning OH&S management system were taken	☐	☐	☐
21	The required documented information is available, updated and controlled.	☐	☐	☐
	5. Operation			
22	Each process required by the OH&S management system is associated with appropriate criteria, controls and documentation.	☐	☐	☐
23	The general preventive principles and hierarchy of controls are considered.	☐	☐	☐
24	Suitable measures for management of change were taken.	☐	☐	☐
25	Suitable measures for outsourcing control were taken.	☐	☐	☐
26	Suitable measures for procurement control were taken.	☐	☐	☐
27	Suitable measures were taken to ensure that the contractors are meeting the requirements of the organization’s OH&S management system.	☐	☐	☐
28	The potential emergency situations were identified and appropriate measures for prevention and response capability were taken.	☐	☐	☐
	6. Performance evaluation			
29	A process for monitoring, measurement and evaluation is established, implemented and maintained.	☐	☐	☐
30	The evaluation of compliance with legal requirements and other requirements was performed and relevant documentation is available.	☐	☐	☐
31	Internal audits have been performed and relevant documentation is available.	☐	☐	☐
32	Periodically management review was performed and relevant documentation is available.	☐	☐	☐
	7. Improvement			
33	The required measures to manage incidents and nonconformities are taken.	☐	☐	☐
34	Suitable measures were taken to ensure the continuous improvement of the OH&S management system and relevant documentation is available.	☐	☐	☐

3.2. Software instrument for the audit of OH&S management system

Today, Microsoft Office® is the most widespread office software, functioning on different types of devices, from PCs to smart phones. Therefore, using this software as a base for the auditing instrument will ensure a large flexibility and a large number of potential users of the application.

The software instrument was designed as a Microsoft Excel® 2013 sheet having the role to record auditor's answers to checklist items, to automatically calculate the score and the conformity level as percentage of the maximum score and to serve as a documented evidence of the performed audit. The head of the sheet, Fig. 1, shows the audit identification data: company, division or department where the audit was conducted, date and auditor(s) name(s). Also, checklist items are represented and for each item the auditor can record a value which can be either:

- 0 – representing 0 points awarded, if there is no evidence of fulfilling the item requirement;
- 1 – representing 1 point awarded, if there is only a partial fulfillment of the item requirement;
- 2 – representing 2 points awarded, if the item requirement is fulfilled.

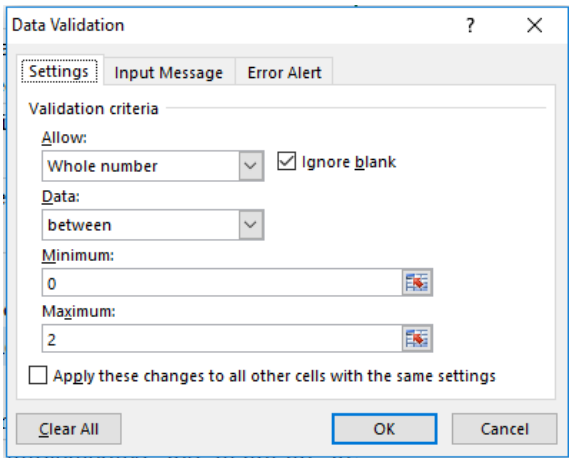
The recorded values are validated by Data Validation function of Excel. The settings for Data Validation function are shown in Fig. 2 (a), the input message is shown in Fig. 2 (b) and the Error Alert settings are shown in Fig. 2 (c).

	A	B	C	D	E	F
1	**Company:**			Auditor(s):		
2	Division/department:					
3	Date:					
4			**Checklist for assessing the OH&S management system**			
5	**Criteria:**					
6	ISO/DIS 45001					
7		No.	Item	Assessment		
8				No (0 pts.) / Partially (1 pt.) / Yes (2 pts.)		
9			**1. Context of the organization**			
10		1	All relevant issues in relation to organization's OH&S management system were determined.	2		
11		2	All relevant interested parties in relation with organization's OH&S management system were determined.			
12		3	The relevant needs and expectation of workers and of other interested parties were identified.			
13		4	The scope of the OH&S management system was determined and documented.	2		
14		5	The OH&S management system is established, implemented, maintained and continually improved.	2		
15			**2. Leadership and worker participation**			
16		6	Top management demonstrates leadership and commitment regarding OH&S management system.	2		
17		7	Top management has established, implemented and maintain an OH&S policy.	2		
18		8	The OH&S policy is documented, communicated, available to interested parties and periodically reviewed.	2		
		9	Roles, responsibilities, accountabilities and authorities for OH&S management system were established, documented and	2		

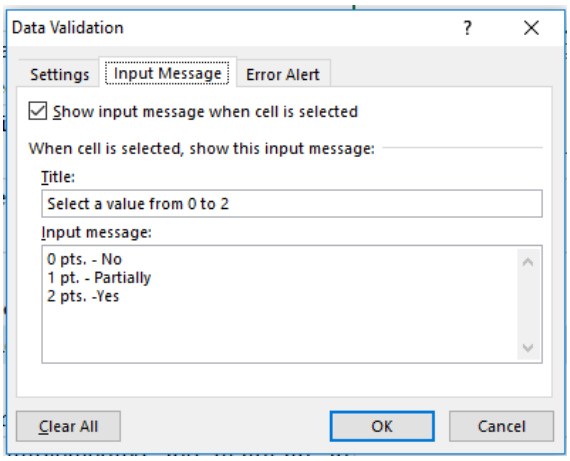
Select a value from 0 to 2
0 pts. - No
1 pt. - Partially
2 pts. -Yes

Sheet1 Sheet2

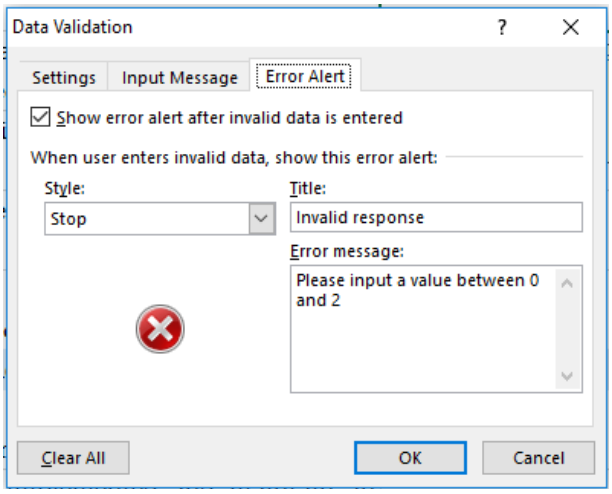
Fig. 1. Software instrument for assessment OH&S management system



(a)



(b)



(c)

Fig. 2. Settings of Data Validation function: (a) Settings for Validation Criteria; (b) Settings for Input Message; (c) Settings for Error Alert

In the lower part of the sheet is presented the results of the audit, Fig. 3. All the results are calculated automatically. Thus, the "Score" represents the total points awarded for all 34 items. The value for this result is shown in cell F51 and is calculated with the Eq. (1):

$$= SUM(D10:D14)+(SUM(D16:D20))+ +(SUM(D22:D27))+SUM(D29:D33))+ +(SUM(D35:D41))+(SUM(D43:D46))+(SUM(D48:D49)) \quad (1)$$

The "Maximum", shown in cell F52, is the score granted if all of 34 items are assessed at maximum, respectively with 2 points each, and has the value 68. The "Conformity level", shown in cell F53, represents the percentage of fulfilling the requirements, and is calculated with the formula (Eq. 2):

$$= F51 / F52 \quad (2)$$

The "Interpretation" is shown in cell E55 and may be one of the following:

- "POOR" – if "Conformity level" is below 75%;
- "LOW" – if "Conformity level" is higher or equal to 75%, but below 85%;
- "MEDIUM" – if "Conformity level" is higher or equal to 85%, but below 95%;
- "VERY GOOD" – if "Conformity level" is between 95% and 100%.

The "Interpretation" cells are completed automatically, according to the "Conformity level" value, by using the following equation in cell E55 (Eq. 3):

	A	B	C	D	E	F
43		29	A process for monitoring, measurement and evaluation is established, implemented and maintained.		2	
44		30	The evaluation of compliance with legal requirements and other requirements was performed and relevant documentation is available.		2	
45		31	Internal audits were performed and relevant documentation is available.		2	
46		32	Periodically management review was performed and relevant documentation is available.		1	
47			**7. Improvement**			
48		33	The required measures to manage incidents and nonconformities are taken.		1	
49		34	Suitable measures were taken for ensuring continual improvement of the OH&S management system and relevent documentation is available.		1	
50						
51			RESULTS	**Score:**		**65**
52				**Maximum:**		**68**
53				**Conformity level:**		**95.59%**
54				**Interpretation:**		
55					**VERY GOOD**	
56						

Fig. 3. Audit results

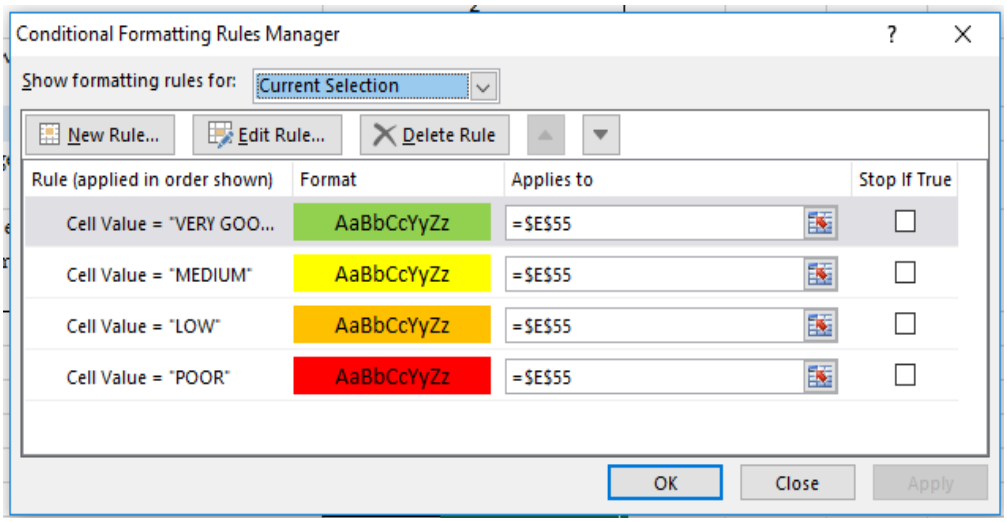


Fig. 4. Conditional formatting rules for "Interpretation" value

$$= IF(F53<0{,}75,"POOR".IF(F53<0{,}85,"LOW", ,IF(F53<0{,}95,"MEDIUM","VERY GOOD"))) \quad (3)$$

For an easier perception of "Interpretation" value, we use the "Conditional Formatting" feature of Microsoft Excel© 2013, creating a set of rules for automatic different coloring the "Interpretation" cell (E55) in function of its value. This set of rules is represented in Fig. 4. After the completion of checklist and obtaining the results provided by the software instrument, appropriate corrective and preventive actions should be established for low-rated items, for example, for those assessed with 0 or 1 point. The Corrective and Preventive Actions Plan can be elaborated in any form that is suitable for the organization, but anyhow, it should provide the person in charge, the deadline and the resources necessary for each action.

The high-level checklist and the software instrument could be used for auditing an OH&S management system in different phases of its evolution, from initial implementation to re-certification. The completed checklist could be used as a milestone and provide a synthetic image of the OH&S management system at a specific moment. The results of audits conducted at different moments could be used by the top-management to analyze the evolution of the OH&S management systems. Also, the information provided by these audits should be completed with information collected from other sources such as risk assessment or evaluation of compliance with legal requirements or other requirements. Special attention should be paid to considering the new and emerging risks that are relevant to the organization and the management of changes.

4. Conclusions

Concern for organization's occupational health and safety issues is sustained by their potential to determine negative effects on quality and environmental management. At the same time, this affects the organization's public image and their economical evolution. To manage the new and emerging risks in a proper way, the organizations should adopt new approaches and new tools to continually improve their OHS performance.

Many companies are already familiar with the OHS management systems implemented according to OHSAS 18001 standard requirements, and in this context, the transition to the expected standard ISO 45001 should be a smooth process. Anyhow, this new standard requires specific instruments for implementation and auditing process.

The results of this study consist in a high-level checklist which could be used to assess the implementation of the ISO 45001 standard requirements, and a software instrument that could be used as a support for assessing process. The high-level checklist represents an important audit instrument which provides valuable information about the OHS management system at a certain moment and could serve as a base for the analysis of the evolution of the OHS management system over multiple cycles of its functioning.

The software instrument benefits from the large flexibility and widespread use of Microsoft Excel® 2013 and has the role to record auditor's answers to checklist items, to automatically calculate the score and the conformity level as percentage of the maximum score and to serve as documented evidence of the conducted audit.

One of the most important characteristics of the software instrument is its portability to different devices having different operating systems, such as personal computers, tablets and smartphones. Also, the operation of the software instrument is very simple, requiring basic knowledge of Microsoft Excel® 2013.

These instruments are intended to be used by organization's internal auditors as well as by external

auditors for both OHS management system implementation and certification purpose.

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