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A New Model for Evaluating Occupational Health and Safety Management Systems (OHSMS)

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Since January 2010, by "Fondazione Alma Mater" in Bologna, a task force is operating in constructing a new model able to evaluate the performance of a company, concerning health and safety in the workplace. Academic and company members, in spite of different cultural background, collaborate to the task force, because in the project many features are involved: organizational-economic, legal and medical-psychological and engineering features. The target is to develop a methodology that quantifies the "health and safety" level of a company.
Several scientific and company components, (a number wider than that of the mentioned authors) have contributed and worked together to build this new tool, whose main goal is to achieve a synthetic evaluation of the existing management system and to identify the organizational model, though not formalized in a management system, able to depict the acquired level of health and safety warranties for the workers.
The tool worthiness is strictly operative and allows the company organization to improve its performances by acting on the identified critical issues, in any case ensuring that the model tested and licensed contains a high level of reliability.
In the present paper the structure of the arranged model is introduced and the reasons of the performed choices are explained.

1. Methodology introduction

Originally, the aim of this working group was to build an innovative system for the evaluation of both occupational health and safetymanagement system (OHSMS) and models of organization for companies any size. Its creation was made by preparing a methodology, called M.I.M.O.SA. (Methodology for the Implementation and Monitoring of OccupationalSAfety), which is, in the aim of those who worked there, an operational tool to understand, manage and measure enterprise performances about health andsafetyin workplaces.

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Thanks to its properties in describing and evaluating key elements of models is also called "meta-model".
This new tool has tried to achieve the balance between two important features, which are: the evaluation of systems and/or patterns of health and safety organization and management in workplace, and the ability to measureeffectiveness in exempting the administrative liability – as included in Legislative Decree n. 231/2001 (IHS, 2008).

1.1 Methodology properties

As previously said, the proposed methodology allows to choose, examine and validate management systems and organizational management models. It also allows to identify the critical elements which occur. It also helps to understand, manage and measure enforced enterprise performances of health and safety in workplace.Finally, one ofthe main innovations of this system is the ability in giving a concise judgment that reflects the gained level of health and safety in workplace.

1.2 Original elements

M.I.M.O.SA. methodology can be used by small or large-sized companiesin 2 different directions. By one direction, it represents the acquired level of guarantee of worker's health and safety, by the other direction,it is useful to all other companies that want to improve their compliance with law requirements. The short self-assessment is obtained through the analysis of theoretical and formal features of management and organizational models and its real implementation on the workplace allows the company to test the efficiency and effectiveness of its safety policy.It also gives elements to measure the adoption and effective implementation of examined organizational and management models.
Another original feature of M.I.M.O.SA.methodology is the transfer of knowledge, skills and tools to the company in order to improve its standards of health and safety.These standards are also valid in the absence of a formalized management system or in the absence of an organizational model, and through the only analysis of the existing organizational structure the standards give also support to future development of formalized models. That means the M.I.M.O.SA. methodology is equally exploitable by small companies that haven't implemented a OHSMS.

2. General structure

The structure presented in Figure 1 contains:
- the key-elements, which are necessary for a proper OHSMS even for small companies which are widely present in the Italian reality;
- the themes, large in number, which contribute to develop each key-element and their importance (e.g. for second key-element some themes are: risk evaluation, prevention and protection measures, participation, events monitoring…).

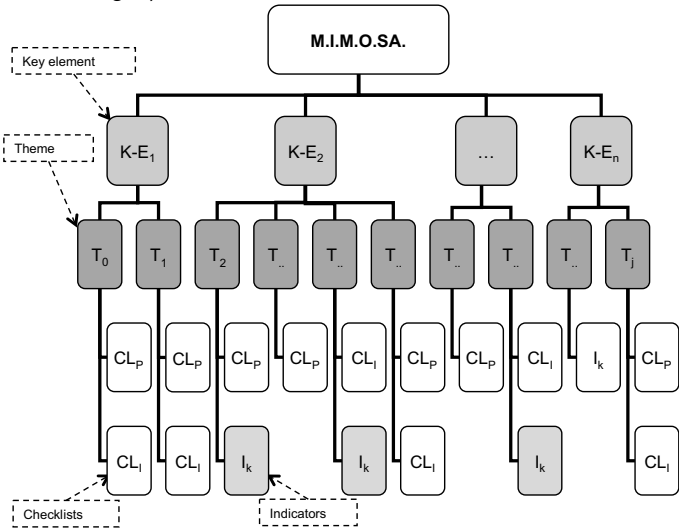

Figure 1: Tree structure of the MIMOSA system.

It has to be noted that the set of key elements works for a correct OHSMS implementation, in order to obtain an assessment of the organization and management model adopted by enterprises.In this context key-elements and themes, by and large, allow the overall evaluation of the model, that should take into account the formal representation (structure), its real applicationand the achieved results (performance) according to the following criteria: adequacy to the stated purposes, answer to the needs of company prevention and compliance requirements.
The key elements are determined by a complex analysis. The goals of analysis have been management systems and models for health and safety, but also organizational practices and direct experiences; consequently they are not determined only by the Italian law requirements or by the directives.

2.1 Key elements

The methodology is structured into 6 key elements, arranged in a list that defines a hierarchy ofpriorities. The six elements are:
1- Leadership and coherence with targets;
2- Orientation to risk reduction and people protection, in compliance with the law;
3- Involvement, learning and development of personal education;
4- Continuous improvement and innovation;
5- Formal and general compliance;
6- Social responsibility.
Each key element is detailed in specific themes and each theme has been developed by the work group: checklists of two types - planning and implementation (P and I in Figure 1), and performance indicatorshave been created.
The first key element wants to give evidence that a proper ability of leadership of the company communicates the importance of appropriate requirements for health and safety in the workplace.The leadership exercised by top management influences the behaviors of members of the company. The leadership consists in the interaction between employers and/ormanagers (like membersin the higher company positionand with organizational responsibility) andemployees.The leadership definestargets and activities for the culture diffusion in any levels of enterprise and by the use of human, technological and economics resources it directs at protection and prevention of health and safety worker behaviors (Flin R. et al., 2000; Christian M. et al., 2009)..
The second, the third and the forth key element consider activities that have the greatest impact on the level of health and safety (even without the formalization of a real model). The second key element: “Orientation to risk reduction and people protection, in compliance with the law”refers to the compliance with the law, but more attention is put on compliance with requirements that governsubstantial features or priorities and have a great influence on levels of health and safety at work. Formalrequirementsare not considered.The third Key element: “Involvement, learning and personal education development” is devoted to show that all human resources operating in the enterprise are the fundamental essence of the organization. The fourth key element: “Continuous improvement and innovation” highlights the importance of continuous improvement that is achieved through the known Deming cycle, which consists of 4 continuous stages of action and verification (Plan, Do, Check, Act).
The fifth “Formal and general compliance” is constituted by some bureaucratic formalities required by law,particularly important if the target is effectiveness in exempting the administrative liability.
Finally, the sixth key element, “Corporate Social Responsibility”, wants to increase the awareness of companies about social issues and environmental sustainability.

2.2 Themes of key elements

In Table 1 the structure of M.I.M.O.SA. is presented. Somes themes in the table are hidden by privacy. The themes are 27 and are partitioned into the six key elements as follows:
1- Leadership and coherence with targets: three themes;
2- Orientation to risk reduction and people protection in compliancewith the law: eleven themes;
3- Involvement, learning and development of personal education: four themes;
4- Continuous improvement and innovation: two themes;
5- Formal and general compliance: three themes;
6- Social responsibility: four themes.

As can be easily seen, each theme is explained by check-lists and indicators, which measure the importance of the considered theme.Onlythe presence of check-lists and indicators is shown in Table 1, being their number different in each theme.

Table 1: Key elements and themes of M.I.M.O.SA. System

Key element	Theme	Check-lists	Indicators
1-Leadership and coherence with targets	1-Responsibility organisation and structure	X	X
	2-Direct involvement in the management	X	X
	3-Management of economic resources	X	X
2-Orientation to risk reduction and people protection in compliance with the law	4-Risk assessment	X	X
	5-Mesuares of prevention and protection	X	X
	6-Education, training and information	X	X
	7-…	X	X
	8-Risk monitoring	X	X
	9-Events monitoring		X
	10-Health surveillance		X
	11-Emergencies		X
	12-…	X	X
	13-Safety levels improving	X	
	14-Vigilance at work	X	
	15-Safety climate	X	
3-Involvement, learning and development of personal education	16-Risk perception	X	
	17-…	X	
	18-…	X	
	19-Control system	X	
	20-…	X	
4-Continuous improvement and innovation	21-Compliance with formal requirements of sector	X	
	22-…	X	
5-Formal and general compliance	23-Recording system	X	
	24-Human resources	X	
	25-Etical and institutional aspects	X	
	26-…	X	
6-Social responsibility	27-Environment	X	

2.3 Details oftwo key elements and their themes

The second key element is "Orientation to risk reduction and people protection in compliance with the law". This element collects attainments requested by Legislative Decree 81/2008 (IHS, 2008), with particular attention to activities thathave the major impact on risk reduction and people protection. Inother words that compliance with legislation, which regulatesthese aspectshas priorityif compared with the compliance of laws which govern purelybureaucratic/formal requirements. These last, although are important for company documentation,do not influencedirectlythe growth of levels of health and safety.Indeed activities, such as maintenance of equipment or fruitionof DPI (individual protection devices), are clearly crucial to themaintaining of an acceptable state of health and safety of worker.In this second key element there aren't only "Substantial"attainments, which affecthealth and safety levels, but alsoadditional elements useful for the definitionof an efficient and effective safety policyin

workplace.These kinds of activities are distributed in eleven themes.The first theme is "risk assessment", that means the examination of allaspectsof work, devoted to establish what can cause injury or damage and to eliminate hazards or to determine the measures for prevention and protection. The top positionof this theme highlights that risk assessment is essential for a proper safety management in company.
There areother 10 themes like: "preventive and protection measures", "risk monitoring", "health surveillance","emergencies", etc.
Formal requirements of Legislative Decree 81/2008, which are excluded from this key element, are contained in the fifth key element “Formal and general compliance".
Third key element is “Involvement, learning and development of personal education”. The full involvement of human resources allows to invest their abilities to the service of the organization. Many studies recognize the important role of people management processes quality, as well as quality organizational processes, to obtain a safer workplace (Barling et al., 2000; Neal et al., 2000; Inness M. et al., 2010).
Consequently, the implementation and the maintenance of a good OHSMS depends in equal measure by the quality of organizational processes and by the quality of workers participation (Geller, 2002; Reason, 1997; Zohar, 1980). For this reason, basic requirements of a correct management system are: the enhancement of a favorable safety climate, the development of common perceptions about the present risks in work activities, the realization of effective communication processes in company and the presence of incentive systems of desired safe behaviors and disincentive systems of risk behaviors.
An important theme of this key element is "safety climate". Safety climate is a theoretical term used by safety researchers and HR professionals to describe the sum of employee perceptions regarding overall safety within the workplace. Safety Climate is “the manifestation of safety culture in the behavior and expressed attitude of employees.”
Safety Climate refers to the attitudes towards safety within an organization in a specific time (while Safety Culture is concerned with the underlying beliefs and prevailing values over time).
Thus, Safety Climate refers more specifically to workers’ perceptions of how safety is managed in the workplace and the likelihood those perceptions will contribute to a safer workplace. In many studies, safety climate has resulted as one of the best “leading indicators” of the safety performances by companies, a kind of measures that precede or predict safety outcomes and indicate the impact of human, organizational and managerial factors on safety performance. Traditionally, ‘lagging indicators’ have been used to identify trends in accidents that occur within the workplace (i.e. lost time injuries, time and place of accident, type of injury).
However, in recent years an increasing body of evidence suggests that more attention should be focused on ‘leading indicators’ like safety climate. By identifying an organization’s safety climate within an organizational workplace, managers gain an opportunity to identify the state of safety within that workplace without having to wait for the system to fail.

3. Self-assessment methodology

The self-assessment system is possible thanks to check-list and indicators that were developed for each theme. In general a check-list collects information on compliance requirements, business risks knowledge, presence of critical points, etc. Whereas the indicators are referred to specific issues and allow to assess the resultof what wasplanned and implemented.

3.1 Check-list

A check-list includes a set of questions: to answer positively means a fulfillment with legal obligation, or highlights the presence and the solution of critical issues.Ultimately with a check-list existent problems are shown and is verified if their solution is being planned and implemented. The check-lists have been divided considering the difference between planning and implementing questions, and the positive answer to questions of second type assumes a high importance in the following quantification.

3.2 Key performance indicators

Key performance indicators are widely used in various sectors (environment, safety, economy, energy). A performance indicator, like all typical indicators in each field, is defined by: "An indicator is a parameter which shall be representative of the whole complexity of the phenomena considered, although is only a characteristic of them, and should be easily measurable."

This statement comes from the description of environmental indicators, which are able to characterize a complex phenomenon in a synthetic and easy form, in order to provide a tool that makes visible a phenomenon not immediately obvious.

4. Conclusions

The M.I.M.O.SA. methodology is a tool for self-evaluation that all concerned companies may use to control if their management features work well inpromoting health and safety in workplaces. The methodology focusesalso on the target of protecting workers according in force law. For this aim it is arranged in a tree structure which includes key elements each of them being constituted by several themes.

The introduction of check-list and indicators aims to allow the quantification in this way representingwith a concise but comprehensiveway the status of the company.In addition the quantification may be important to measure the overall performance and to guide the actions for improvement.

Summarizing, at the operational level, the methodology M.I.M.O.SA aims to:

•evaluate the results achieved, primarily in terms of health protection of workers but also of legal compliance;

•evaluate the effective safety organization and practices;

•evaluate the validity of any formal organizational model chosen;

•define the necessary repairs and improvements to various levels of organization (formal model, real organization, business practices).

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