Journal of Achievements in Materials and Manufacturing Engineering
International Scientific Journal published monthly by the World Academy of Materials and Manufacturing Engineering

Analysis of integrated management system of the quality, environment and occupational safety

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ABSTRACT

Purpose: In this article the analysis of integrated management system of quality, environment and occupational health and safety was presented. The functioning of such system on the selected enterprise was discussed.

Design/methodology/approach: The new standards of PN-EN ISO 9001:2015, PN-EN ISO 14001:2015 were presented. Also, the occupational health and safety management system according to the new ISO 45001 standard was shown. The necessity of the management systems integration was presented.

Findings: In this paper the changes in PN-EN ISO 9001:2015, PN-EN ISO 14001:2015 were presented. The advantages and disadvantages of the integrated management system in the selected enterprise were shown.

Practical implications: The most important changes in ISO standards for quality, environment and occupational health and safety were presented. There is also significant to show the faults in implementation and operation of the integrated management system, what will protect other organizations before such problems.

Originality/value: In this paper indicated that only proper implementation of the integrated management system based on PN-EN ISO 9001, PN-EN ISO 14001 and PN-N-18001 could provide real benefits. Otherwise, it is an unnecessary waste of time and money.

Keywords: Integrated Management System; ISO 9001; ISO 14001; PN-N-18001; Integrated Management System Operation

Reference to this paper should be given in the following way:

A. Kania, M. Spilka, Analysis of integrated management system of the quality, environment and occupational safety, Journal of Achievements in Materials and Manufacturing Engineering 78/2 (2016) 78-84.

INDUSTRIAL MANAGEMENT AND ORGANISATION

1. Introduction

The pace of change in the environment in which operate the enterprises makes traditional approach to management to be insufficient, requiring the introduction of strategic thinking [1]. The implementation of integrated management system (IMS) for quality, environment and occupational safety is one way of getting a better position

on the market. Therefore, the enterprises increasingly using such solution in the last years. It allows the companies to provide customers about the highest parameters of the final product from one hand, on the other hand it makes easy to optimize resources and ensure a better communication inside the company [2,3].

The Integrated Management System is defined as "one, clearly defined, documented and coherent system, that enables efficient and simultaneous management of multiple aspects, through the establishment and implementation of a uniform policy and the resulting goals for these aspects" [3]. Therefore, the essence of IMS is consistent and simultaneous management of multiple aspects, in this case quality management, occupational health and safety management and environmental management.

British Standards Institution (BSI) defines Integrated Management System as an "integration of processes, procedures and working practices in the organization to implement its policy, which may be more effective in achieving the goals of the policy than approach by separate systems" [4]. In this case, integration means the ability to connect systems operate in the company, specified in the separate standards.

Due to the increasing number of management system standards and increasing use of different management system standards in organizations there is a need to makes possible the implementation of systems and their integration. Therefore, the International Organization for Standardization (ISO) has defined for all management system standards a new, common, basic structure (the same section titles, common basic text and common terms and basic definitions). The new basic structure applies to all newly elaborated and the amended management system standards [5].

2. Quality management system

The most frequently used, standardized management standard in the enterprise is the quality management system, which enables to achieve strategic goals of the company, optimizing enterprise productivity, meeting customer requirements, obtaining reproducible high quality products.

The quality management system proposed in PN-EN ISO 9001:2015 Quality management systems - Requirements is still based on a process approach, but its centre is a leadership that is associated by feedback loops with planning, support and operational activities undertaken in the enterprise, results assessment and improvement. The whole model of the quality management system is based on the PDCA cycle (Plan - Do - Check - Act). Building a management system according to the new guidelines of PN-EN ISO 9001:2015 organization must analyse its context directed on knowledge and understanding of functioning essence with respect to the closer and further environment in which it is. Understanding the needs and expectations of stakeholders will carry out much more accurate overview of the conditions in which the enterprise currently operates and will operate in the future. Identification and understanding the context of the organization determine the internal and external aspects that will allow to identify the quality objectives, quality policy and create a quality manual. This help in efficient management of the created system, what makes possible achievement of the strategic business objectives.

The fifth edition of the PN-EN ISO 9001 standard contains an ordered structure that gives its clarity and makes easy the users to use it in practice (Fig. 1).

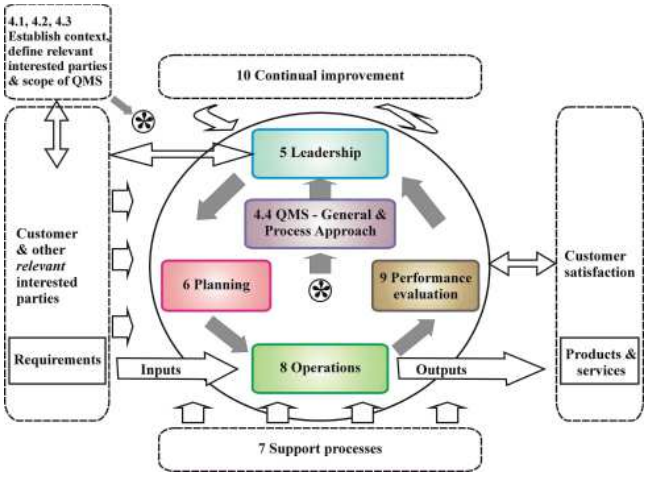

Fig. 1. Structure of ISO 9001:2015 with the PDCA cycle (the numbers in figure are the numbers of the section titles)

A significant change in ISO 9001:2015 are: specification of required inputs and expected outputs of processes, assignation of responsibility and qualifications within the processes, consideration of specific risks and opportunities, evaluation of processes and implementation of the necessary changes.

One of the main changes in ISO 9001 is to accept a systematic approach to risk. The risk-based approach provides identifying, considering and monitoring of the risk during design and operation of a quality management system [6].

In PN-EN ISO 9001:2015 is used the more general term of "improvement" which one component is continuous

improvement. "The organization shall identify and select opportunities for improvement and implement all necessary actions that meet customer requirements and enhance customer satisfaction.

These actions shall include [7]:

- improvement of products and services to meet customer requirements and future needs and expectations;
- correction, prevention or reduction of the adverse effects;
- improvement of activities effects and effectiveness of the quality management system."

3. Environmental management system

The second commonly used management standard is an environmental management system (EMS). The system goal is to support organizations in management of influence of their activities, products and services on the environment and minimize these impacts and efficient use of available resources.

Environmental management system is based on requirements of the international ISO 14001 standard (Fig. 2). After almost twenty years since the first edition, in 2015 published its third edition.

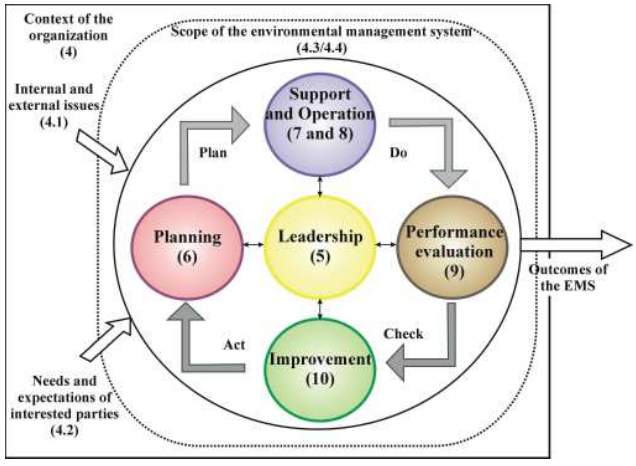

Fig. 2. Model of the management system according to PN-EN ISO 14001

The keynote of the new standard is a precise connection between EMS and daily function of organization. This is because of conviction that environmental protection should not be regarded only as an unwanted burden but can also be a source of opportunities for organizations such as more efficient use of resources and avoidance of compensations and legal sanctions [8].

EMS is a tool to achieve the established goals. New requirements for understanding the context of the organization to identify and move from opportunities to benefits for the organization and the environment included in it. The issues related to the needs and expectations of stakeholders (including regulatory requirements) and local, regional or global environmental conditions that may influence on the organization, and conversely were specified. The activities directed on mitigation (reduction) of negative risk and use of opportunities should be included in the strategic EMS planning. The organizations will have to extend their supervision and the influence on the environmental impacts associated with the use of products and their end of life cycle or liquidation. The standard does not require a detailed life cycle assessment. It is sufficient to consider only simply life cycle stages that can be controlled or subject to the influence of the organization. The new PN-EN ISO 14001 standard change in emphasis from the continuous improvement of the environmental management system to improve environmental performance [9].

4. Occupational health and safety management system according to PN-N-18001 standard

The enterprises applying the above-mentioned management systems (or one of them) often look to another management standard, which is the occupational health and safety management system. This action is a result of much attention to the employee (human) as an essential element of business processes. The occupational health and safety management systems also take the interests of other stakeholders into account, e.g. all persons whose are at the enterprise area [1].

The occupational health and safety management system, like the previously discussed systems, is a part of the enterprise management system and includes all the elements determining the policy and goals of the companies in the range of occupational safety and achievement of these goals.

The most important stages in the implementation of the occupational health and safety management system are [10,11]:

- identification of the organization policy in relation to occupational safety,
- goals and management program for activities in the occupational safety,
- implementation and maintenance of occupational health and safety management system,

- trainings, building consciousness and skills of all employees,
- supervision of occupational health and safety management system through the implementation of corrective/preventive actions,
- activities making possible the effective estimation of the system operation by measuring, monitoring and improving performance.

The most important tasks and goals of the implemented occupational health and safety management system are:

- prevention of worker's injury and associated losses with it,
- elimination of occupational diseases of employees,
- reduction of a disease absenteeism of employees,
- employee commitment to actions on occupational health and safety,
- increase of productivity and work quality in the organization.

Therefore, the most important element of the occupational health and safety management system is an occupational risk management. Based on the hazards identification and assessment of the risk associated with it an organization should plan and implement appropriate technical and organizational solutions.

Unfortunately, PN-N-18001:2004 is the Polish Standard and does not have the status of the international ISO standard. International Organization for Standardization (ISO) is trying to prepare a standard with requirements of the occupational health and safety management system but work has not been completed. The main reason for the failure to develop a common international standard are significant differences in legislations in different countries of Europe.

The main differences between the OHSAS 18001:2007 standard (which is analogue in Polish Standard of PN-N-18001:2004) and the planned international ISO 45001 standard are:

- harmonization of the structure with PN-EN ISO 9001, PN-EN ISO 14001 systems and other management systems. A growing number of organizations which implement and certify several systems from the ISO family is the reason for increasing demand for standardization of the structure of these standards;
- requirement to monitor by the certified organization both internal and external risks that may influence on its activity, and occupational safety;
- increasing emphasis on the role of leadership in the system, assignation of universal factors to measure and evaluate a leadership commitment in the system maintenance;
- requirement to monitor the hazards/occupational safety factors in the area of outsourcing activities; the activity contract out to subcontractors can have a very high impact on the organization activity, therefore the risk factors in this area should be identified and monitored.

The ISO 45001 standard will give a confidence for its users that their management systems are compatible with applicable law, monitor any risks that may impact on the organization activities. The professional implementation of such system potentially protects the workers' lives, reduce the number of accidents, costs associated with it and increase morale of the employees.

5. Integration of management systems

Every organization's management system can be regarded as an integrated impact on all spheres of its activity.

The integrated management one can identify as a rational connection of the quality, environment and occupational safety management systems (Table 1). The aim of the management systems integration primarily is to harmonize and coordinate common resources, requirements and guidelines for all these areas [12]. The integration has to provide such cooperation that synergy result brings a greater efficiency and effectiveness of people activities and organizational projects [13]. To provide a single, coherent enterprise management system necessary is to identify the basic elements of these systems, identify opportunities for such form of them to meet the economic criteria of the company operation and requirements of the appropriate standards [14].

Table 1.
Special features of the quality, environmental and occupational health and safety management systems [16]

Specification	Quality	Environment	Occupational health and safety
Conditions determined by	PN-EN ISO 9001:2015	PN-EN ISO 14001:2015	PN-N 18001:2004
Criteria	quality	environmental aspects	occupational risk
Consumers	customers	society	employees
Goals	profit	elimination or reduction of the negative environmental impacts	elimination or reduction of the occupational risk

The quality system makes the processes stable, reproducible, and improve. Customers take a confidence that the delivered products and services meet the established requirements. Indirect customers are employees who, through the proper work organization can concentrate on business activities by themselves made. The company becomes more reliable, what contributes to the stabilization of their life situation [15].

The occupational health and safety management system guarantees the safety and it is compatible with legal laws at the work position. Its customers are primarily employees, and indirect are the health care system and social security [15].

The environmental management system guarantees that the enterprise is consciousness in what way it influences on the environment. The negative aspects of this influence it tries to minimize. Moreover, in a more efficient way it uses the resources and energy [17].

Integrated management system, including those aspects, guarantees the fulfilment of all requirements of the individual systems [18]. However, the process of management systems integration is a difficult and complicated action, so the guidelines for system integration are developed [19,20]. The example in this area can be PAS 99 standards - the world's first Publicly Available Specification for integrating common management systems.

PAS 99 standard highlights the common elements of these systems and outlines a framework to integrate them. The requirements in this standard include auditing procedures, risk management, document control and improving performance. Usage of this specification to integrate the quality, environmental and occupational health and safety management systems is very effective. Moreover, it also meets all regulatory requirements [21].

Integration of management systems brings the following benefits for organizations (Table 2) [21]:

- fulfilment of all standard requirements in one set of rules and procedures,
- one-time audit of several systems to save money and resources;
- improving the productivity by removal of the necessity of repeating the tasks;
- clearly defined roles and responsibilities highlight common goals;
- facilitating continuous improvement of all management systems.

Table 2.
Features and benefits of IMS implementation [21]

Business risk	Business need	Feature of standard	Advantages	Benefits
Management of multiple management standards can be wasteful in time and resources.	To streamline the business and have 'one' management system in place.	Requires one set of processes that covers all of the organization's activities.	Requirements of the specific standards are coordinated. Workloads are streamlined. Duplication and bureaucracy are reduced. Systems for internal audits, document control, training and administration are much more effective.	More management time for proactive measures. Only one management review required which should be part of a board meeting therefore showing top level commitment to the system.
Conflict between business systems.	To avoid internal empires, provide clearly defined objectives and have one system benefitting the whole organization.	Requires that consequences of any actions are taken into account and consideration given to how they affect each other and their associated risks.	Ensures a more holistic approach to management.	One system means less time spent on correcting impacts on other areas. More management time for implementing proactive measures which will ultimately lead to increased customer satisfaction.

6. Analysis of integrated management system for quality, environment and occupational health and safety operation

The integrated management system implemented in the analysed enterprise includes following activities:

- transmission, distribution and trading of electricity, heat, fuel gas, industrial water, circulating water, sanitary water, demineralised water, submersible water and compressed air and nitrogen,
- wastewater reception and disposal of sewage waste,
- condensate treatment,
- telecommunication services,
- laboratory services.

IMS includes all organizational units of the enterprise with except of design, development and validation process.

IMS processes were identified in the enterprise. The processes are divided into three categories: general (creating value), auxiliary (not creating the values), management and improvement (supporting the creation of value). These processes are described as follows:

a) general processes – are the core business activities of the enterprise, they contribute directly to the creation of value added (customer service, realization of product/service, production planning);
b) auxiliary processes – provide the correct realization of general processes (purchases, supervision of technical infrastructure, monitoring equipment to control and tests, laboratory tests);
c) management and improvement processes (system management, personnel management).

The operation assessment of implemented IMS in the analysed enterprise is based on analysis of employee questionnaires. Moreover, the following areas of the integrated management system were analysed (Figs. 3,4):

- number of customers,
- number of accidents (at work, communication accidents),
- number of incompatibilities,
- environmental aspects:
  - amount of water consumption,
  - amount of waste,
  - amount of waste disposal.

A group of employees were subjected to questionnaires in order to obtain more information on: the overall impact of IMS on enterprise activities, the most important advantages and disadvantages of the system, the role and quality of documentation and information flow.

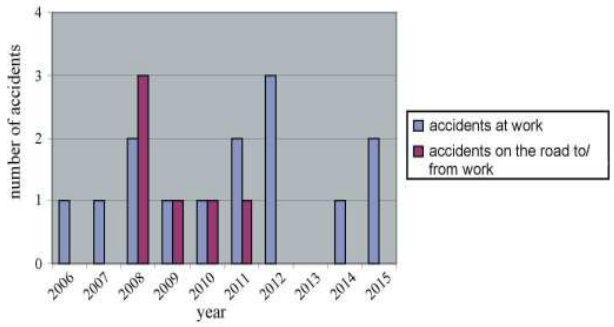

Fig. 3. The number of accidents at work

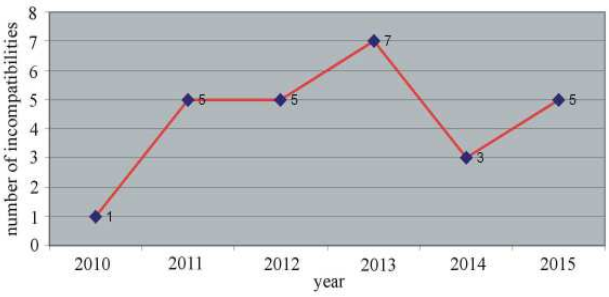

Fig. 4. The number of incompatibilities

Analysis of obtained information showed that in the enterprise is lack of employee's commitment in the system operation, documentation is one of the weakest parties of it. Performance of duties related to the documentation fulfilment by employees causes many problems. Documentation is not only too comprehensive, but very detailed. Analysis of questionnaires also showed that IMS principles are intelligible for employees, but sometimes they consciously breaking them. There is also the lack of support from leadership, what is a worrying problem.

Analysis of selected areas of IMS (changes in: the number of customers, work accidents, incompatibilities, environmental aspects) indicated that IMS does not fulfil its function because:

- there is no correlation between the number of customers and the implemented IMS operation (small increase is due to the creation of new companies and division of existing as a result of economic changes),
- number of work accidents has not decreased,
- number of incompatibilities is still at high level (from 3 to 7 small incompatibilities),
- amount of waste generated and disposal has been reduced,
- amount of water consumption decreased significantly after four years since the system was implemented.

There was no expected improvement of selected indicators, and in some cases reported falling off situation.

It was found that IMS has been not effectively implemented. Therefore, it has to be modernized and implemented once again, with particular emphasis on: creation of leadership commitment, reconstruction of documentation and improvement of worker's consciousness on integrated management system.

7. Conclusions

The enterprise development is associated with the necessity of continuous changes resulting mainly from the need to follow the competition, adapt to the market expectations and implementation of new technologies and methods. There is a need to effectively manage these changes, retaining the stability of the business processes [22]. The idea of continuous improvement manifests itself in improving the quality of offered products, the quality of conditions in which products are manufactured and improvement of the natural environment quality [23]. The management systems help to get most benefits in the enterprise, and their integration enable these benefits increase without additional investment of time or money [24].

In this paper indicated that only proper implementation of the integrated management system based on PN-EN ISO 9001, PN-EN ISO 14001 and PN-N-18001 could provide real benefits. Otherwise, it is an unnecessary waste of time and money.

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