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INTEGRATED SAFETY MANAGEMENT SYSTEM

Abstract: *An integrated management system refers to the application of several different international standards, and it contributes to efficient and effective organizational management. The Quality Standards were first developed at the end of the twentieth century; however, due to social, political and many other reasons, the The International Organization for Standardization has also developed standards related to occupational health and safety, environmental protection, information security, risk management, energy efficiency, etc. Since all of these standards are process-oriented, there is an emerging need to simplify their implementation. Similarly, valid versions of ISO 9001, ISO 14001 and ISO 45001 standards identical in structure have been adopted in the last five years, which facilitated their integrated implementation and application. This paper describes a concept of integrated management system through a standardized safety management system.*

Key words: ISO standards, management, safety, integration.

INTRODUCTION

By analyzing Deming's management principles, it becomes clear that they were the basis for the development of management principle in ISO standards. With that in mind, it could be said that Deming's principles of organizational functioning are the foundation for integrated management systems. The existence and the development of an organization depend on a well-organized management system. Although the very process of introducing or switching to IMS is the most sensitive period in an organization, the benefits of having such system are numerous. An integrated management system does not entail the disappearance of already existing management systems in an organization; moreover, it can be understood as their improvement towards a better, simpler and more functional management system.

IMS needs to integrate all current formalized systems focused on quality, environmental protection, health and safety, staff, finance, etc. This means that the processes and documents that describe them need to be integrated as well. Once the enterprise identifies all interested parties (stakeholders) it can be determined which management systems should be included in their business system.

Funding resources for the establishment and certification of the IMS can be enterprise's own business resources, as well as the incentives and a combined source of funding i.e. incentive funds and the remaining amount of funds from the financial resources of the enterprise.

Given the complexity of the implementation of the integrated management system, full commitment of management and their representatives is necessary in order for the process of introduction and improvement of standards to be sound and sustainable.

IMS ANALYSIS (ISO 9001, ISO 14001, ISO 45001)

There are ten common elements in international standards ISO 9001, ISO 14001 and ISO 45001: subject matter and scope, normative references, terms and definitions, context of the organization, leadership and employee participation, planning, support, implementation of operational activities, performance evaluation, and improvement. However, certain requirements from one standard do not necessarily relate to other standards, as shown in Table 1 [1,2,3].

Table 1. *Comparative analysis structure of standards ISO 9001, ISO 14001 and ISO 45001*

ISO 9001:2015	ISO 14001:2015	ISO 45001:2018
1. Scope	**1. Scope**	**1. Scope**
2. Normative references	**2. Normative references**	**2. Normative references**
3. Terms and definitions	**3. Terms and definitions**	**3. Terms and definitions**
4. Context of the organization	**4. Context of the organization**	**4. Context of the organization**
4.1. Understanding the organization and its context	4.1. Understanding the organization and its context	4.1. Understanding the organization and its context
4.2. Understanding the needs and expectations of interested parties	4.2. Understanding the needs and expectations of interested parties	4.2. Understanding the needs and expectations of workers and other interested parties
4.3. Determining the scope of the quality management system	4.3. Determining the scope of the environmental management system	4.3. Determining the scope of the OH&S management system
4.4. Quality management system and its processes	4.4. Environmental management system	4.4. OH&S management system
5. Leadership	**5. Leadership**	**5. Leadership and worker participation**
5.1. Leadership and commitment	5.1. Leadership and commitment	5.1. Leadership and commitment
5.1.1. General		
5.1.2. Customer focus		
5.2. Policy	5.2. Environmental policy	5.2. OH&S policy
5.2.1. Establishing the quality policy		
5.2.2. Communicating the quality policy		
5.3. Organizational roles, responsibilities and authorities	5.3. Organizational roles, responsibilities and authorities	5.3. Organizational roles, responsibilities and authorities
		5.4. Consultation and participation of workers
6. Planning	**6. Planning**	**6. Planning**
6.1. Actions to address risks and opportunities	6.1. Actions to address risks and opportunities	6.1. Actions to address risks and opportunities
	6.1.1. General	6.1.1. General
	6.1.2. Environmental aspects	6.1.2. Hazard identification and assessment of risks and opportunities
	6.1.3. Compliance obligations	6.1.3. Determination of legal requirements and other requirements
	6.1.4. Planning action	6.1.4. Planning action
6.2. Quality objectives and planning to achieve them	6.2. Environmental objectives and planning to achieve them	6.2. OH&S objectives and planning to achieve them
	6.2.1. Environmental objectives	6.2.1. OH&S objectives
	6.2.2. Planning to achieve environmental objectives	6.2.2. Planning to achieve OH&S objectives
6.3. Planning of changes		
7. Support	**7. Support**	**7. Support**
7.1. Resources	7.1. Resources	7.1. Resources
7.1.1. General		
7.1.2. People		
7.1.3. Infrastructure		
7.1.4. Environment for the operation of processes		
7.1.5. Monitoring and measuring resources		
7.1.6. Organizational knowledge		
7.2. Competence	7.2. Competence	7.2. Competence
7.3. Awareness	7.3. Awareness	7.3. Awareness
7.4. Communication	7.4. Communication	7.4. Communication
	7.4.1. General	7.4.1. General
	7.4.2. Internal communication	7.4.2. Internal communication
	7.4.3. External communication	7.4.3. External communication
7.5. Documented information	7.5. Documented information	7.5. Documented information
7.5.1. General	7.5.1. General	7.5.1. General
7.5.2. Creating and updating	7.5.2. Creating and updating	7.5.2. Creating and updating
7.5.3. Control of documented information	7.5.3. Control of documented information	7.5.3. Control of documented information

8. Operation	**8. Operation**	**8. Operation**
8.1. Operational planning and control	8.1. Operational planning and control	8.1. Operational planning and control 8.1.1. General 8.1.2. Eliminating hazards and reducing OH&S risks 8.1.3. Management of change 8.1.4. Procurement
8.2. Requirements for products and services 8.2.1. Customer communication 8.2.2. Determining the requirements for products and services 8.2.3. Review of the requirements for products and services 8.2.4. Changes to requirements for products and services 8.3. Design and development of products and services 8.3.1. General 8.3.2. Design and development planning 8.3.3. Design and development inputs 8.3.4. Design and development controls 8.3.5. Design and development outputs 8.3.6. Design and development changes 8.4. Control of externally provided processes, products, and services 8.4.1. General 8.4.2. Type and extent of control 8.4.3. Information for external providers 8.5. Production and service provision 8.5.1. Control of production and service provision 8.5.2. Identification and traceability 8.5.3. Property belonging to customers or external providers 8.5.4. Preservation 8.5.5. Post-delivery activities 8.5.6. Control of changes 8.6. Release of products and services 8.7. Control of nonconforming outputs	8.2. Emergency preparedness and response	8.2. Emergency preparedness and response
9. Performance evaluation	**9. Performance evaluation**	**9. Performance evaluation**
9.1. Monitoring, measurement, analysis and evaluation 9.1.1. General 9.1.2. Customer satisfaction 9.1.3. Analysis and evaluation	9.1. Monitoring, measurement, analysis and performance evaluation 9.1.1. General 9.1.2. Evaluation of compliance	9.1. Monitoring, measurement, analysis and performance evaluation 9.1.1. General 9.1.2. Evaluation of compliance
9.2. Internal audit	9.2. Internal audit 9.2.1. General 9.2.2. Internal audit programme	9.2. Internal audit 9.2.1. General 9.2.2. Internal audit programme
9.3. Management review 9.3.1. General 9.3.2. Management review inputs 9.3.3. Management review outputs	9.3. Management review	9.3. Management review
10. Improvement	**10. Improvement**	**10. Improvement**
10.1. General	10.1. General	10.1. General
10.2. Nonconformity and corrective action	10.2. Nonconformity and corrective action	10.2. Incident, nonconformity and corrective action
10.3. Continual improvement	10.3. Continual improvement	10.3. Continual improvement

Considering the fact that certain requirements in standards are at the same time the legal requirements that each organization must fulfill and maintain, it is recommended that documented information is compiled accordingly, in order to comply with legal regulations and obligations. In this way, the management system could be effectively and efficiently implemented and maintained.

The novelty in the new versions of standards refers to a clearly defined concept of organizations and a detailed analysis of the interested parties.

Interested parties represent a very important segment in the management system because they are not related to customer orientation only, but refer to the influence that the management system has on society and vice versa, with particular reference to the employees who are an essential link for the system sustainability. As defined in standards, interested parties may produce a significant risk to sustainability of an organization if their expectations are not met. If we take into account their significance, interested parties are considered a part of an organization; moreover, they are a segment that defines an organization, its function and orientation. Interested parties vary across the standards depending on the scope they regulate, as shown in Table 2.

Table 2. *Interested parties in reference standards*

ISO 9001	ISO 14001	ISO 45001
Customers	Customers	Workers
Owners	Social community	Top management
Workers	Suppliers	Managers
Suppliers	Legislative institutions	Non-managerial persons
Bankers	Unions	Suppliers
Legislative institutions	NGO	Contractors
Unions	Workers	Individuals
Business partners	Investors	Agencies
Social community		Unions
Competition		Institutes
		Legislative institutions
		Doctors

In order to meet the standard requirements when it comes to the definition of interested parties, it is not enough only to identify and enumerate them, but it is necessary to define their relationship with the organization through relevant needs and expectations, such as for example:

- responsibility - investors
- proximity - neighbours (surrounding organizations)
- dependency - employees
- representation - trade unions
- authority - competent legislative institutions and the like.

It is easy to define interested parties with whom an organization is in contact with; however, the problem arises when it is needed to identify interested parties that do not directly affect the operation within the organization on a daily basis, see Figure 1. In this case, it is necessary to conduct a research that is based on past experience, scientific and political facts.

Quantitative and qualitative analysis is mainly carried out with the matrices which refer to the interested parties, their needs and expectations, as well as their impacts on the organization. According to such analysis, the types of interest and risk levels are determined using the elimination method.

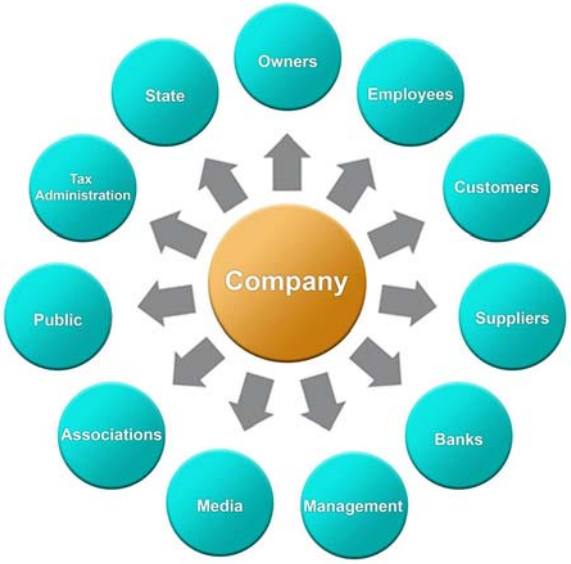

Figure 1. *Interested parties*

Understanding the needs and expectations of interested parties as a standard requirement is indispensable in case of:

- defining the scope of the management system
- customer satisfaction
- fulfillment of the requirements in compliance with the legal regulations
- continuous improvement of the organization and its management system.

IMPLEMENTATION OF IMS (ISO 9001, ISO 14001, ISO 45001)

The implementation of an integrated management system is not the same for all organizations. The main differences appear due to different volume of work, the number of employees, variety of processes, and organizational management. Basically, each implementation involves the following steps of action:

- Introducing management to standard requirements. Management and management delegates for IMS or individual segments of the IMS are familiarized with standard requirements which point to the importance and the scope of implementation of the integrated management system standard.
- Analysis and assessment of system status. By analyzing the current state of the organization, it becomes clear to what extent the standard requirements have been fulfilled. Based on this, the starting elements for improving the management system and the development of the accompanying documented IMS information are determined. In practice, this step is not performed in detail. Also, sufficient attention is not paid to all the elements essential to the implementation, maintenance and improvement of the management system during system analysis. A team of experts who implement IMS needs to be fully acquainted with the manner of work in organizations and the documentation they use. Reliable data analysis leads to an objective assessment of the degree of harmony between the current and desired state of the organization.
- Development of a work program to improve the management system. The system improvement program, based on the established state, defines the necessary phases:
  - activities on redefining the existing documented information and
  - designing new documented information.
- The work program should contain the time frame needed to perform the activities of the entire management implementation project. The work program, based on the results of system state analysis, needs to be adjusted to the organizational structure and must take into account the specific requirements regarding the need to ensure unhindered functioning of the system. Creating an adequate work program on the implementation of an integrated management system often places the work organization in serious problems because the scope of the required documented information depends on a large number of factors that vary from company to company. They usually involve: the activities and the size of an organization; the number, significance, and manner of conducting individual processes in an organization; the number of employees, etc. The quality of the work program is directly dependent on the analysis of the situation in the company, but most often, the scope and structure of the required documented IMS information cannot be precisely defined because there are no precise rules.
- Project team training. For selected members who will actively participate in IMS implementation, it is necessary to conduct training and enable them to create and maintain documented information about the integrated management system. At this stage, team members need to be fully acquainted with the work program, drafts of the specific documents related to the program, and the manner and timing of maintaining the documented information for the referent standard requirements within their competence.
- Introduction of an integrated management system. The introduction of an integrated management system in the anticipated time frame should be the result of teamwork, and it should require full support from the management and very often the engagement of expert consultants. The ultimate result of the work, with or without the involvement of consultants, should be drafting of all the documented information predicted in the work program.
- Trial application of drafted documents. This step is necessary for verifying the quality, detection, and elimination of potential defects in the created documentation. A trial application can be done successively after defining the draft of the document group or after the adoption of complete IMS documentation. After testing and possible correction, the documents are finally adopted and fully applied.
- Training for internal auditors. This training is mandatory for organization participants who are assigned as internal system management auditors. Performing this training is recommended when the conditions are met, that is, when the program involves the adoption of a certain number of documents that can be the basis for practical work.
- Internal verification of established IMS. This test, which is a necessary step before external evaluation by the certifying body, must be carried out by trained internal auditors. The aim of the test is to remove any disagreements before IMS certification; however, this type of inspection must be performed at scheduled intervals and only after obtaining a certificate.System certification. The certificates can be obtained only if the external (certification) verification is performed by an authorized certification organization and if all the previous steps are carried out in an adequate manner. It should be noted that during all the above-mentioned steps in the implementation the integrated management system, there is a need for constant coordination of project implementation activities [4].

Coordination is carried out in line with predicted project phases, and includes the control of implementation of program key elements. Also, a project manager should be nominated by the consultant organization whereas a manager should be authorized by the organization. After the certification has been performed, the work on system upgrading continues, as the requirements of all organizational management standards imply further improvement of the work process in accordance with Deming's PDCA cycle, as shown in the flow chart in Figure 2.

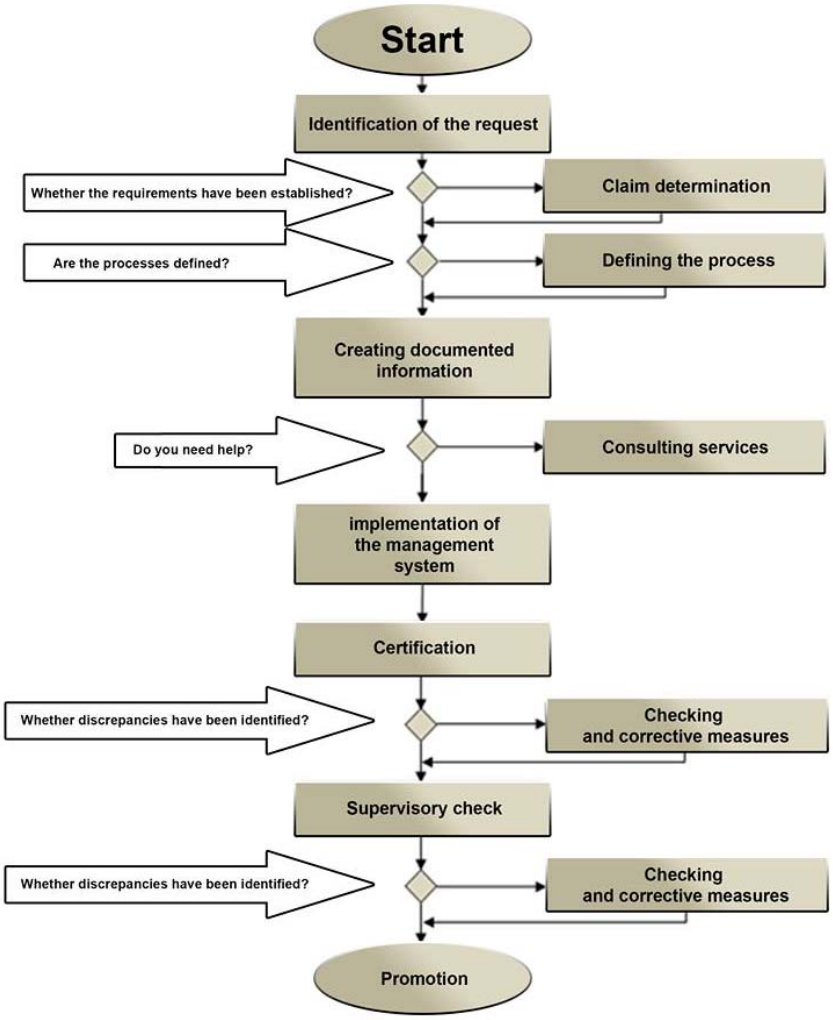

Figure 2. *Diagram - IMS Implementation*

According to past experience, the design of adequate documentation of the system in accordance with the existing processes represents the most critical stage in the implementation of the integrated management system. The reason for this is the absence of any rules that would be used when deciding which processes i.e. activities should be documented through the appropriately documented information of the integrated management system. In this step, the consultants rely mostly on their experience, which is sometimes insufficient. Consequently, continuous monitoring and constant improvement of the implemented management system is necessary in order to maximize the level of effectiveness and functionality of an integrated management system.

PROBLEMS AND SUGGESTIONS DURING IMS INTRODUCTION

The most common opinion connected to the process of introducing ISO standards in the contemporary business is that the process itself will be long and exhausting, that there will be no real benefits from the established system, and that the employees will lose time when filling in extensive and unnecessary documents.

Negative publicity of the process of introducing the ISO standard has been influenced, among other things, by the bad experience of organizations that have established a management system, great volume of documentation of the management system, the adaptation to a new way of working, i.e., changing the existing way of doing business for the fulfillment of

standard requirements, as well as the overload of employees engaged in maintenance of the management system [5,6].

The introduction of ISO standards represents the strategic decision of the organization. During the activities of the quality management system, the strong support of the top management is of great importance. Without this kind of support the system would not exist and the already defined rules of business would remain only in theory. It is commonly known that the introduction of standards in modern business is one of the most common requirements for certain tenders, and very often the reason for elimination. If the top management intends to introduce standardization only to obtain a certificate that will meet the requirements of a particular tender, then the organization will not be able to recognize the real benefits of the established management system because the system will not exist [7].

The scope of documentation of the integrated management system depends on the size and complexity of the organization's business processes. However, regardless of the size, complexity, and type of work that a particular organization carries out, the scope of the documentation must be reduced to its real needs. Documentation of an integrated management system must not unnecessarily burden its immediate users, and it must be limited only to the documentation that is required for the execution of everyday work tasks. When defining the necessary volume of documentation, the experience, knowledge, and creativity of those people who will be engaged in the implementation of standards can be of great help [8].

When introducing ISO standards, an organization must delegate tasks, i.e. assign a person or persons who are parts of senior management and will have to claim the responsibilities and authorization related to the introduction and maintenance of an integrated management system. The organization's responsibility is to appoint a team of people who will, regardless of their other responsibilities, actively participate in the implementation and application of the system. When selecting a team of people, organizations need to take care that people must be from different organizational units/processes. The main problem facing the practice is that the organizations do not clearly define the responsibilities and powers of all employees regarding the application of the established integrated management system. All members of the team are obliged to point out to all the requirements for the application of the system to their subordinates and train them for proper application of the documentation. Responsibility for applying the system in each organizational unit is taken by the named process owner. The introduction of ISO standards does not require any financial investment in infrastructure or organization resources (business or manufacturing premises, employees, equipment, etc.). Financial investment in infrastructure or resources is conditioned by the current legal regulations of our country, not the requirements of the standards. The introduction of ISO standards implies recognition and incorporation of all requirements of the legal regulations pertaining to the scope of the organization's business. Accordingly, depending on the size of activity and the size of the organization, there will be certain requirements for financial investments in terms of the reorganization of business or production premises, engagement of authorized firms for carrying out workplace risk assessments and testing working conditions, periodic inspection of work equipment and the like.

As far as the need to introduce ISO standards is concerned, the most important decision standing before organizations is the choice of an adequate consultant who will be engaged in implementing the standards. The real situation on our market is that there is a large number of firms involved in implementing a management system, with different work methodologies, and working methods and prices. When selecting a consultant who will be engaged in the implementation of the standards, the organization should, besides the project cost, consider the following project values:

- knowledge and professional experience of project team members of the consulting house;
- reference list;
- defined work methodology;
- expected commitment of project team members;
- real benefits from introducing ISO standards.

A very important step when introducing ISO standards, perhaps even the most important, is the approach to the implementation process itself. The real effects of the established and applied management system can only exist if the work approach is based on the incorporation of standards requirements and their adaptation to the manner of operation within an organization, and not vice versa [9].

By applying a process approach when implementing ISO standards, respecting the good sides of the organization's business and adopting them as the examples of good practice, by designing and defining opportunities for improvement, where opportunities or needs are met, the organization will have a good foundation for achieving long-term economic prosperity. Certainly, the top management of the organization has major benefits of setting up and applying ISO standards [10].

In a properly established system, it is possible to achieve a more efficient and effective operation if we clearly define the processes, their interdependencies, parameters of their effectiveness, responsibilities and authorizations for all direct executives in the organization, and above all, if we respect defined business rules. In this way, organizations will develop good control and reporting system, on the basis of which the senior management will be able to make timely and efficient decisions, and thus influence further successful development and improvement of the business.

CONCLUSION

An integrated management system, as a management model, is becoming a business imperative in the organizations. The benefits of an effective integrated management system in organizations include: clearly defined duties and responsibilities, increased transparency of an organization, improved system performance, increased level of customer trust, higher degree of process structure, greater motivation of employees and a much-facilitated coordination and control over processes, activities, interested parties, and employees.

In order for the standard implementation to be effective, it is necessary to find business mechanisms which will save time and money, and reduce problems related to dramatically experienced changes which are a consequence of the implementation of the standard. Accordingly, adaptation to the integrated management system occurs in two phases. In the first phase, individual systems are integrated into an integrated; while in the second phase, the standards are integrated both in practice and in the strategy of the former basic management system in a particular organization. The new strategy of the standardized management system in line with the requirements of standards contributes to modern and professional strategic position of the organization on the market, complete satisfaction of interested parties, and socially responsible activities and business.

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BIOGRAPHY of the first author

Ivan Krstić was born in Niš, in 1972. He received the Ph.D. degree in Occupational and environmental safety from the University of Niš, Faculty of Occupational Safety. He is Lead Auditor of an Integrated Management System according to ISO 9001, ISO 14001, ISO 45001 and BS OHSAS 18001. He is employed at the Faculty of Occupational Safety as an Associate Professor teaching the courses in the field of System and Risk Safety. He is currently the Vice-Dean for Quality and Publications at the Faculty of Occupational Safety.

INTEGRISANI SISTEMI UPRAVLJANJA ZAŠTITOM

Ivan Krstić, Ana Stojković

Rezime: *Integrisani sistem menadžmenta se zasniva na zajedničkoj primeni više međunarodnih standarda čime se postiže efikasno i efektivno upravljanje organizacijom. Najpe su se krajem dvadesetog veka razvili standardi iz oblasti upravljanja kvalitetom, međutim zbog tržišnih, socijalnih, političkih i mnoštvo drugih razloga, Međunarodna organizacija za standardizaciju je razvila standarde koje se odnose na bezbednost i zdravlje na radu, zaštitu životne sredine, bezbednost informacijama, upravljanje rizikom, energetsku efikasnost i dr. S obzirom da su svi ovi standardi procesno orijentisani javila se potreba da oni budu komplementarni kako bi se praktično pojednostavila njihova implementacija. Analogno tome, u poslednjih pet godina su usvojene važeće verzije bazičnih standarda ISO 9001, ISO 14001 i ISO 45001 koji su po strukturi identični čime je pojednostavljeno njihovo integrisano uvođenje i primena. U radu je dat koncept integrisanog sistema menadžmenta kroz standardizovani sistem bezbednog upravljanja.*

Ključne reči: ISO standardi, upravljanje, bezbednost, implementacija.