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MANAGEMENT SYSTEM OF OCCUPATIONAL SAFETY AT UKRAINIAN ENTERPRISES: INTERNATIONAL AND EUROPEAN DIMENSION

Abstract. The international and European experience in creating and improving integrated systems in the field of occupational safety and health on the basis of research regulatory documents of the International Organization for Standardization, European standards, national standards of Ukraine, industry and methodical documents on management of occupational safety and health of oil and gas complex enterprises is overviewed. The implementation features of OHSAS 18001 and ISO 45001 international standards to create an integrated safety management system of professional activity have been studied. The ways of implementing the analyzed requirements in the industry safety standards of occupational activity of oil and gas complex enterprises of Ukraine are considered. A number of hazardous events related to occupational activity at the enterprises: industrial safety, technogenic safety, labour hygiene and safety, ecological safety, psychophysiological safety has been considered and a generalizing scheme of dangers and hazardous events has been created. A model of an integrated management system for occupational safety activities for oil and gas enterprises is proposed based on the involvement of scientific literature, regulatory documents using the structural-logical method, systematization and generalization, and methods of meaningful and comparative analysis. It is proved that the management system, based on the principles of the cyclical model of quality management by E. Deming should include such aspects as: quality and risk management, environmental management, occupational safety management, social responsibility and power management.

Keywords: occupational safety; oil and gas complex; integrated management system; occupational safety management and international standards.

Introduction

The European integration processes of the economic policy of modern Ukraine, as a result, reaching the international level, mastering competitive products, the spread of foreign economic relations with the countries of Europe and the world, undoubtedly influenced the creation of new approaches to the organization of professional activities in production, occupational safety and the integration of regulatory documents of Ukraine to the international and European level. All the above requires industrial enterprises to take into account all aspects that affect their success and to pursue policies in the field of quality management, ecology, aimed at harmonizing the relationship between producers, consumers, staff and society. The introduction of modern integrated management systems to increase competitiveness is gradually becoming an integral part of the functioning of Ukrainian enterprises. However, while quality management systems in accordance with the requirements of ISO 9001 international standard and environmental management in accordance with the requirements of ISO 14001 have become traditional, international standards for occupational safety are given less attention. Nevertheless, the issue of occupational safety is very urgent at industrial enterprises, and it concerns oil and gas enterprises. Undoubtedly, the oil and gas complex is the leading industry in Ukraine and has social, economic, commercial and political functions. Its prospects depend on the modernization of not only the material and technical base, but also the introduction of an effective management system based on the requirements of international standards. A key role in the creation of integrated management systems for enterprises of the oil and gas complex of Ukraine belongs to the problems of occupational safety.

Many publications are devoted to the peculiarities of creating integrated management systems. The direct model, allows the development and implementation of occupational safety management systems is proposed in [1]. The authors have proved that a system based on the method of strategic planning is more effective. The experience of optimizing and updating the management system of occupational safety and health of an industrial enterprise is reflected in [2]. In the publication it is proved that the developed system of occupational safety management makes it possible to reduce the number of emergencies and accidents. Publications allow tracing the peculiarities of the implementation of international and European standards [3]. The works [4-5] are devoted directly to the creation of integrated management systems for oil and gas enterprises. The greatest extent of the trend of the implementation of management systems is considered in [6], which outlines occupational safety and health at oil and gas enterprises and focuses on the creation of the safety management system of the operator of the gas transportation system. Peculiarities of implementation of new generation international standards are considered.

The analysis of the scientific literature on the identified problem allows us to state that there is no separate study on the need to implement a system of occupational safety management for oil and gas complexes.

The objective of the article is to study modern management systems of occupational activity and to develop a model of this system as an effective component of the integrated management system of oil and gas complex enterprise on the basis of scientific literature, regulatory documents using structural-logical method, systematization and generalization and methods of meaningful and comparative analysis.

Presentation of the main material

The creation and implementation of integrated management systems (IMS) began in the second half of the 1990s. International standards for quality management systems and environmental management systems became the organizational and methodological basis for the creation of such systems. Thus, at the first stage of IMS development, they were based on the documents of two management systems: quality and environment. And often the basis was the ISO 9000 quality management system.

For each particular enterprise the components of the IMS are determined taking into account the peculiarities of functioning, markets, consumer needs, etc. It is clear that in the conditions of European integration the quality management systems have gained special importance. In particular, almost all enterprises in Europe use quality management systems. In addition, most enterprises in Europe, both large and medium-sized, followed an environmental policy. Environmental management is actively being implemented in enterprises in the United States and the Asia-Pacific region.

To have their own environmental management system in accordance with the requirements of ISO 14001 international standards, the relevant documentary base, to conduct environmental audits has already become obligatory for industrial enterprises in most countries [7, p. 8-9].

In the late 1990s, there was a need to develop uniform requirements for management systems of occupational activities of industrial enterprises at the international level, which made it possible to certify management systems. However, the implementation of such systems was quite slow due to the lack of international regulatory documents. The availability of a sufficient number of national standards did not solve the problems with the certification procedure. The conducted analysis of regulatory base of documents on safety systems of occupational activities, including various regulations, recommendations, requirements, and specifications allows drawing some conclusions about the necessity of such a document (Table 1).

The OHSAS 18001 specification «Occupational Health and Safety Management Systems – Specifications» was proposed by the British Standards Institution and became the basis for the development of occupational safety management systems. Further refinements to the standard led to the creation of a new version of the standard – BS 18001: 2007, as a national standard in the UK. Japan, Ireland and South Africa also participated in the development of the document. The document defined the basic terms and concepts in occupational safety. European enterprises pay a great deal of attention to occupational health and safety issues and risk assessment. In addition, the following issues are necessarily considered: the effect of special hazards on occupational safety, salary, information about the terms of the employment contract, vacation, working hours, workspace requirements, and workplace safety regulations. Various special aspects related to the occupational activity of disabled individuals have also been considered. The regulatory framework of the European Union in the field of occupational safety also includes a number of directives aimed at implementing measures to ensure a higher level of protection [8; 9; 10].

The standard developed by the American National Institute for Standardization (ANSI) – ANSI Z10-2012 Occupational Safety and Health Management Systems - is useful for analyzing the effectiveness of occupational safety management systems implementation. This regulatory document accumulates the current world trends of occupational safety and health policy. First of all, it focuses the attention of enterprises on such aspects that occur after the event, i.e. constant statistics of the number of accidents and of fatal accidents, missing work time due to injuries, work restrictions or working transfers and, as a result, the loss of working time. And then, secondly, the so-called «advanced» aspects, to include various activities aimed at preventing accidents. Despite the fact that this regulatory document has the status of a voluntary one, the United States entrepreneurs consider occupational safety issues to be an integral part of their activities [11].

Further activities of the international standardization organizations aimed at improving occupational safety issues led to the creation of the ISO 45001-2018 international standard «Occupational health and safety management systems - Requirements with guidance for use» in 2018 [12].

This document has a completely new structure, although some statements coincide with OHSAS 18001-2007. Gradually it will become a complete replacement of the former. The similarity in its structure with ISO 9001, ISO 14001, ISO 50001 basic standards, etc. makes it possible to integrate the new standard with other management systems [13; 14].

The standard is focused not only on eliminating hazards and minimizing risks, but also on the development and adoption of effective preventive measures. ISO organization has set a deadline of three years for the reorientation of enterprises with the requirements of the new regulatory document. The key provisions of ISO 45001, which are fundamentally different, are aimed at the process approach to incident and non-conformance management, identification of stakeholders, their needs and requirements, developing a plan for handling risks and opportunities, continual improvement of processes, verification of the system efficiency, taking measures, implementation of the concept of «Documented Information», which provides an electronic processing of information. Therefore, the policy of occupational safety has been formed by the countries of Europe and the world's leading concerns for decades and today is already a compulsory factor of occupational activity.

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In Ukraine, occupational safety was regulated by DSTU OHSAS 18001: 2006 and DSTU OHSAS 18002: 2006 documents, which are respectively identical translations of OHSAS 18001: 1999 specification. In 2010, ДСТУ (DSTU) OHSAS 18001: 2010 «Occupational health and safety management systems – Specification (OHSAS 18001: 2007, IDT)» was adopted, based on the new version of OHSAS 18001:2007.

The main provisions reflect aspects such as the implementation of the occupational safety and health policy and verification and control actions, risk assessment and its management, definition of the structure, duties and responsibilities, analysis by the administration and improvement and maintenance of the occupational safety and health management system. It should be emphasized that the recent document is valid until 2022. Considering the international recommendations, the DSTU ISO 45001: 2019 was created, which is an identical translation of ISO 45001: 2018 (IDT) international standard [15].

In addition, a number of documents, summarized in the Table 2, were introduced directly for oil and gas enterprise complexes.

Table 1 – **The regulatory base of the documents of occupational safety management of the oil-and-gas complex enterprises** (the table is developed by the authors on the basis of [7–20])

International standards	European standards	National standards of Ukraine	Normative documents of enterprises
OHSAS 18001:2007 Occupational Health and Safety Management Systems. Requirements	Directive 89/391/ЄЕС On the implementation of measures to encourage improvements in the safety and health of workers at work	DSTU GOST 12.0.230:2008 System of labor safety standards. Occupational safety management systems. general requirements	OST 22-1612-84. Occupational safety management system. General Provisions
ISO 45001:2018 Occupational health and safety management systems	Directive 89/654/ЄЕС Regarding the minimum requirements for safety and health in work areas	DSTU 2293-99 Occupational Health. Terms and definitions of basic concepts	SSBT OCT 5.0384-84. SSBT. Determining the level of occupational safety. Substantive provisions
ISO/TS 29001:2010 Quality Management Systems. Requirements for organizations supplying products and services in the oil, petrochemical and gas industries	Directive 89/655/ЄЕС About the minimum requirements for safety and health protection of workers at the workplace when using work equipment	DSTU 2156-93 Safety of industrial enterprises. Terms and definitions	OST 39-022-85 System of labor safety standards of the oil industry. Dangerous and harmful production factors at oil industry facilities. Classification
ISO/AWI 7101 Health Care Quality Management System Standard [under development]	Directive 89/656/ЄЕС On the minimum requirements for health and safety when employees use personal protective equipment	DSTU 3273-95Safety of industrial enterprises	OST 39-136-82. System of labor safety standards of the oil industry order of implementation of standards
ISO 26000:2010 Guidance on social responsibility	Directive 90/270/ЄЕС About the minimum requirements of safety and health when working with screen devices	DSTU EN ISO 12100:2016 Safety of machines. General principles of design. Risk assessment and risk reduction	SOU 49.5-30019801-115:2014 Rules of technical operation of main gas pipelines
ISO 19011:2018 Guidelines for auditing management systems	Directive 90/394/ЄЕС Regarding the protection of workers from the risks associated with exposure to carcinogens at work	DSTU EN 954-1:2003 Safety of machines. Security elements of control systems. 1. General principles of design	SOU 49.5-30019801-117:2014 The procedure for developing labor standards in PAT Ukrtransgaz
ILO-OSH 2001 Guidelines on occupational safety and health management systems	Directive 92/58/ЄЕС About the minimum requirements for ensuring safety and / or hygiene signs in the workplace	DSTU EN 614-1:2018 Safety of machines. Ergonomic design principles. 1. Terminology and general principles	SOU 49.5-30019801-116:2014 Labor rationing system PAT Ukrtransgaz
	Directive 2000/43/ЄС Regarding the implementation of the principle of equality of persons regardless of racial or ethnic affiliation	DSTU EN 529:2006. Respiratory protection. Recommendations for selection, use, care and maintenance	SOU 49.5-30019801-121:2014 Occupational Health. The procedure for admitting employees of third-party organizations to perform work on sites PAT Ukrtransgaz
	Directive 92/104/ЄЕС On minimum requirements for improving the safety and health of workers of mining enterprises with underground and open pit mining	DSTU EN ISO 10075-2:2004. Ergonomic principles for determining mental workload. 2. Principles of design	

International standards	European standards	National standards of Ukraine	Normative documents of enterprises
	Directive 1999/92/ЄС On minimum requirements for improving the safety and health of workers exposed to potential hazards in explosive atmospheres	DSTU GOST 12.4.041:2006 Means of individual respiratory protection are filtering. General technical requirements	
	Directive 92/91/ЄЕС Regarding the minimum requirements for improving the level of safety and health of workers at mining enterprises, where raw materials are extracted through wells	DSTU 4462.0.02:2005. Conservation. A set of standards in the field of waste management. general requirements	
	Directive 2000/78/ЄС Which establishes a general framework for equal treatment in the field of employment and professional activity	DSTU 4312:2012. Conservation. A set of standards in the field of waste management. general requirements	
	Directive 2003/88/ЄС About some aspects of the organization of working time	DSTU 4933:2008. Conservation. A set of standards in the field of waste management. general requirements	
	BS EN 16348:2013 Gas infrastructure. Safety Management System (SMS) for gas transmission infrastructure and Pipeline Integrity Management System (PIMS) for gas transmission pipelines	DSTU OHSAS 18001:2010 «Occupational health and safety management systems – Specification (OHSAS 18001:2007, IDT)	
	BS 18004:2008 Guide to achieving effective occupational health and safety performance	DSTU 7238:2011. System of labor safety standards. Means of collective protection of workers. General requirements and classification .	
		DSTU 7239:2011 System of labor safety standards. Personal protective equipment. General requirements and classification	

Table 2 – **The Normative and methodological documents of Ukrainian oil and gas enterprises complex in the field of occupational safety**

Legal acts of labor protection	Methodical documents
NPAOP 11.1-1.01-08 Safety rules in the oil and gas industry of Ukraine	Labor protection at the enterprise. A practical guide to the investigation and registration of accidents and occupational diseases
NPAOP 11.1-1.07-90.эSafety rules for the operation of automation tools and systems in the gas industry	Methodical instructions on sanitary protection of reservoirs from oil pollution 23.04.1976
NPAOP 11.1-1.11-86 Safety rules for the operation of gas processing plants	MOT-SUOT 2001 Guidelines for occupational safety management systems (ILO-OSH 2001)
NPAOP 11.1-5.02-86 Instruction on safety of loading works during exploration and development of oil and gas fields on the continental shelf 51-01-22-86	
NPAOP 11.1-1.15-13 Safety rules for oil and gas exploration and development in the Black and Azov Seas	
NPAOP 23.2-1.01-76 Safety rules during operation of oil treatment plants at oil industry enterprises	
NPAOP 23.2-1.10-73 Safety rules for the operation of oil and gas refineries	
NPAOP 23.2-3.26-13 Norms of free distribution of special clothes, special footwear and other means of individual protection to workers of the oil refining industry	

Based on the normative documents, integrated management systems have been developed and implemented at some enterprises in Ukraine. In particular, at Zaporizhstal enterprise the OHSAS 18001: 2007 policy and ILO OHSAS 2001 (the requirements of the International Labour Organization on arrangement

of working places and working conditions) are implemented simultaneously. The integrated management systems are implemented at such enterprises as JSC «AZOT» of chemical profile, PJSC «Odeskabel», etc. [16; 17]

The implementation of integrated management systems at oil and gas enterprises began in the early 2000s. Along with the traditional quality and environmental management systems in 2012. JSC «Ukrtransgas» introduced a certified safety management system (OHSAS 18001: 2007).

Public joint-stock company «Ukrnafta» introduced a certified integrated management system based on subsystems designed in accordance with the requirements of ISO 9001, ISO 14001. The policy in the field of occupational safety is pursued in accordance with the Law of Ukraine «On labour protection» and OHSAS 18001: 2007 international standards in the field of occupational safety and health [18].

The modern integrated quality management system, occupational safety and health in accordance with the requirements of ISO 9001: 2015 and ISO 45001: 2018 standards is developed, documented and implemented in the joint-stock company Ukrainian Institute For Design of Refining And Petrochemical Plants «UKRNAFTOKHIMPROECT» (shortly – JSC «UKRNAFTOKHIMPROECT»). Continuous improvement of the system makes it possible for the enterprise to identify and review risks, improve working conditions, increase the level of occupational safety, reduce the risks of industrial injuries and professional diseases [19].

The enterprises of the oil and gas sector are represented by a rather complex set of technical facilities. It is necessary to take into account various objects of major hazard. There is a real danger of technogenic emergencies, which is a threat to occupational activity and human health (Fig. 1).

The process of occupational activity is carried out in certain conditions of the production environment, which are characterized by a set of elements affecting the ability to work and the state of human health. Abnormal situations are associated with a particular type of human activity, and each of them is necessarily accompanied by human exposure to hazardous and harmful factors of production. It is necessary to take into account that working capacity is also influenced by technological processes, equipment that determines sanitary and hygienic characteristics of working environment. The reasons for dangerous situations may be technical. These include - structural deficiencies, insufficient reliability of production facilities, vehicles, lack of design documentation, incompliance with safety requirements of the technological process, adverse weather conditions, increased concentration of harmful substances in the air of the working area; the existence of harmful radiation, unsatisfactory lighting, increased noise and vibration levels, etc. It is important to consider organizational causes: unsatisfactory functioning, imperfect or lack of safety management system of occupational activity, the absence or low-quality medical examination, violations of safety requirements when operating vehicles, failure to use collective or individual protection means. Psycho-physiological reasons connected with the unfavourable feature of the human factor, incompliance of anatomical and physiological and psychological features of the human organism with working conditions are obligatory [20].

In addition, attention should be paid to new disease tendencies related to these modern strenuous work schedules. The research has been carried out in European countries on new occupational diseases to which attention should be drawn. The spread of sedentary work or long periods of standing (the automation of work and the use of computers leads to muscle-skeleton disorders and puts new demands on ergonomic conditions in the workplace. Mental health disorders are widespread today and are a consequence of stress and overwork related to flexible working hours. We should consider that both stress and musculoskeletal disorders lead to diseases such as hypertension, peptic ulcer disease and cardiovascular disease, among others.

Thus, taking into account the previous analysis of international and European experience in the creation and implementation of integrated management systems it is necessary to conclude that to achieve the required level in the field of occupational safety and health in Ukraine it is essential to take into account current global developments. This allows Ukrainian enterprises to secure both a competitive edge and sustainable development of enterprises and improve their occupational safety. It is necessary to focus on the more worthy of integration ISO 45001 international standard, adopted in Ukraine as identical. However, when creating an integrated safety management system of professional activities of oil and gas complex enterprises, given the list of hazardous situations all aspects should be taken into account.

Basing on the recommendations of ISO 72 Guide on the development of standards for management systems and methodology for creating integrated systems, a structural logical scheme of the integrated management system model for the safety of occupational activities for oil-and- gas enterprises is proposed. It is a combination of PDCA (PLAN- DO-CHECK-ACT) cyclic quality management model by E. Deming and various adapted subsystems. The organic interconnection of all the components of the integrated management system is supported by the involvement of the process and system approaches to management [5] (Fig. 2).

The subsystems of quality management on the basis of DSTU ISO 9001: 2015, quality management at the enterprises of oil, petrochemical and gas industry of the region in accordance with the requirements of DSTU ISO/TS 29001: 2010 «Quality Management Systems. Requirements for organizations supplying products and services in the oil, petrochemical and gas industries (ISO / TS 29001: 2010, IDT)» and environmental management based on DSTU ISO 14001: 2015 have become the organizational and methodological basis of the integrated management system [21].

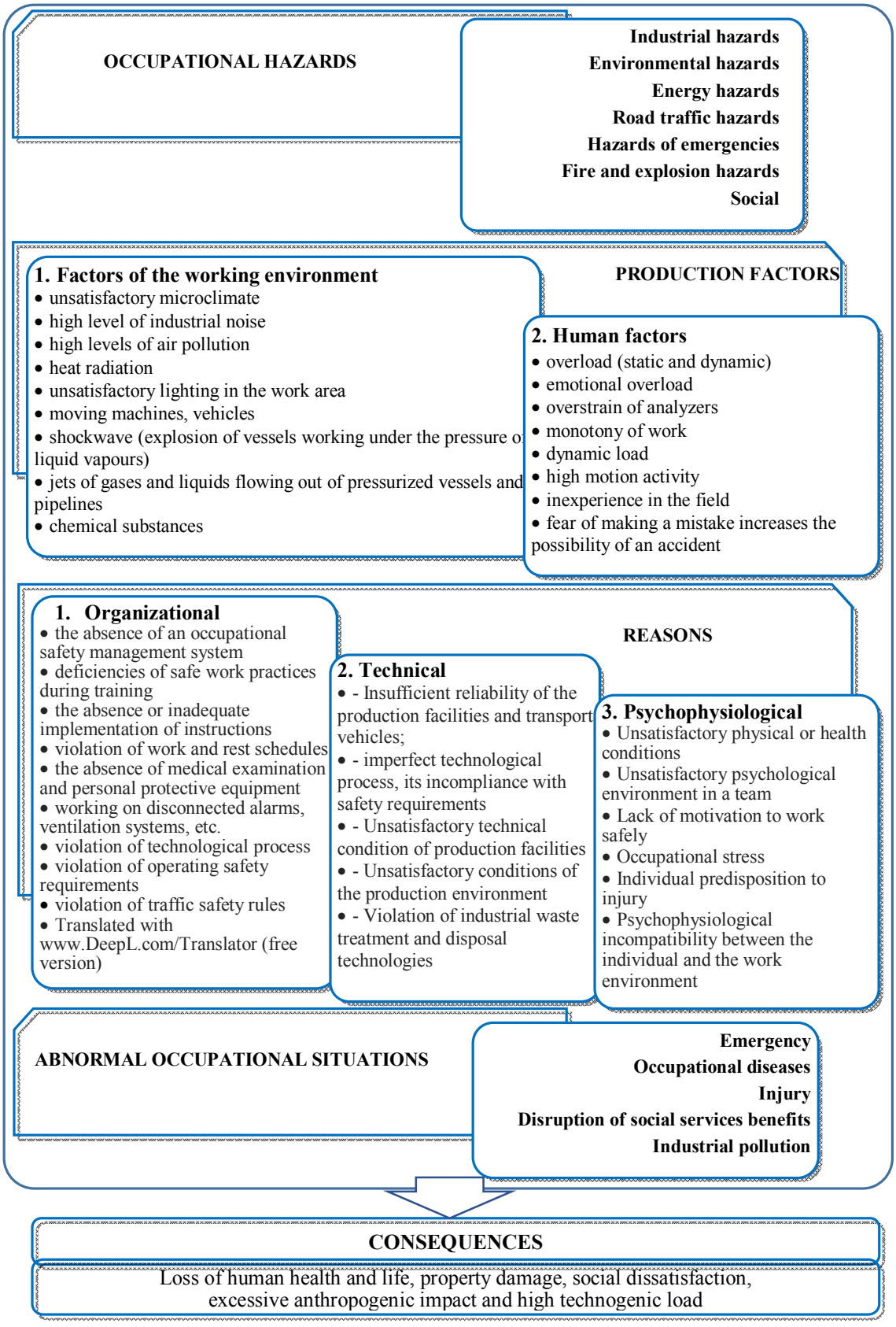

Fig. 1. The structural-logical scheme of dangerous situations of oil and gas complex enterprises

An industrial safety subsystem based on DSTU OHSAS 18001: 2010 as well as ISO 45001: 2018, which are necessary to support directly the occupational health and safety management system and are based on risk-based thinking.

The national standard of Ukraine DSTU ISO 31000: 2018 «Risk Management. Principles and settings» (ISO 31000: 2018, IDT) became the basis for the organization of the risk management system. The involvement of these documents contributes to the

modern risk management concept. This normative document is not specific to a particular industry and is recommended for use in the creation of integrated management systems [22].

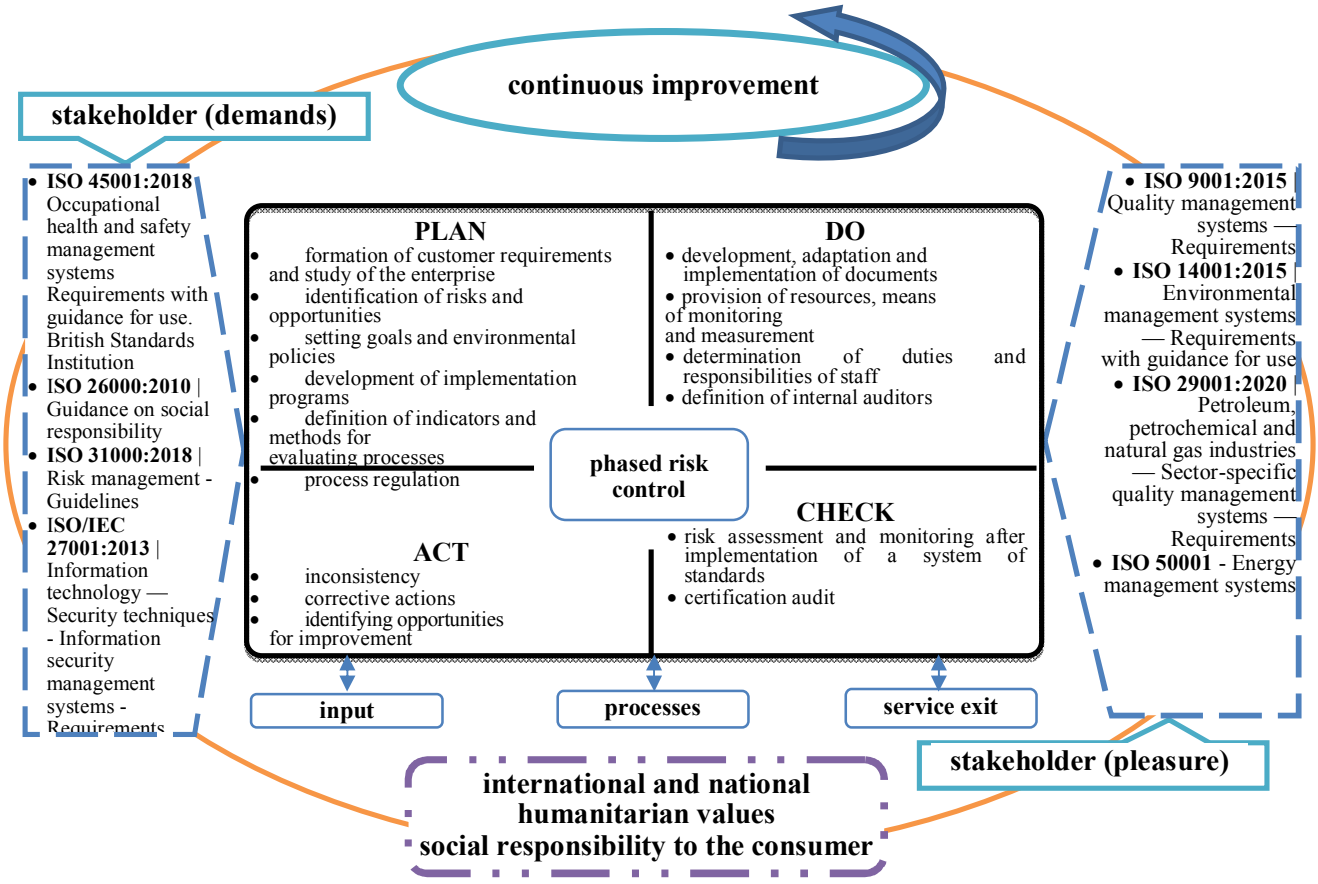

Fig. 2. The structural - logical scheme of the integrated management system model of occupational activity safety for oil and gas complex enterprises

The social responsibility subsystem is based on the regulatory requirements of ISO SA 8001: 2008 «Social Accountability 8000» and ISO SR 26000 «Social responsibility of organizations», which reflect the provisions of the International Labour Organization Convention and the Universal Declaration of Human Rights and the United Nations Convention on the Rights of the Child. Their involvement reduces the risks of violating social regulations, promotes the development and implementation of social security and is an effective means for the practical realisation of moral and ethical standards. In addition, the interests of environmental protection and economical use of resources are taken into account [23].

Some differences in energy efficiency policies in Ukraine and European countries, the United States of America cause the attraction of ISO 50001 «Energy Management System. Application requirements and guidelines», the integrated management system standard. Advanced countries are focused on an integrated approach, which considers energy efficiency in a complex with ecology and competitiveness aspects [24].

Conclusions

To sum up, the study of international and European experience of creating and improving occupational safety management systems leads to the conclusion about the necessity and possibility of developing such systems for Ukrainian enterprises. The analysis of initiatives to implement such systems at the enterprises of oil and gas complex of Ukraine shows that this process is proceeding rather slowly. The adoption of national standard based on the requirements of ISO 45001 international standard is important for modern policy of safety of occupational activity and human health protection of the national industrial complexes.

The analysis of hazards and dangerous situations, connected with oil and gas industry, reinforces these conclusions.

The formation of an integrated occupational safety management system takes place in four main stages, such as planning, implementation, verification and adjustment.

An indispensable component of the process of formation of an integrated management system is the use of the process and system approach in a complex.

The proposed model of integrated occupational safety management system includes such subsystems as: quality and risk management, environmental management, social responsibility, occupational safety, continuous improvement and enhancement.

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Система менеджменту безпеки професійної діяльності на підприємствах України: міжнародний та європейський вимір

О. Є. Тверитникова, Ю. Є. Демідова, Т. В. Дроздова

Анотація. Узагальнено міжнародний та європейський досвід зі створення та удосконалення інтегрованих систем в галузі безпеки праці та охорони здоров'я на основі дослідження нормативних документів Міжнародної організації стандартизації, європейських стандартів, національних стандартів України, галузевих та методичних документів з управління охороною праці та виробничої безпеки підприємств нафтогазового комплексу. Вивчено особливості впровадження міжнародних стандартів серії OHSAS 18001 та ISO 45001 щодо створення інтегрованої системи менеджменту безпеки професійної діяльності. Розглянуто шляхи впровадження проаналізованих вимог у галузеві стандарти безпеки професійної діяльності підприємств нафтогазового комплексу України. Розглянуто низку небезпечних подій, пов'язаних з професійною діяльністю на підприємствах: промислова безпека, техногенна безпека, гігієна та безпека праці, екологічна безпека, психофізіологічна безпека та створено узагальнюючу схему небезпек та небезпечних подій. Запропоновано модель інтегрованої системи менеджменту безпеки професійної діяльності для підприємств нафтогазового комплексу на основі залучення наукової літератури, нормативно-правових документів з застосуванням структурно-логічного методу, систематизації та узагальнення та методів змістовного та порівняльного аналізу. Доведено, що система менеджменту, засновуючись на принципах циклічної моделі управління якістю Е. Демінга повинна включати такі аспекти, як: управління якістю та ризиками, екологічне управління, менеджмент безпеки професійної діяльності, соціальна відповідальність, енергоменеджмент.

Ключові слова: промислова безпека; нафтогазовий комплекс; інтегрована система управління; менеджмент безпеки професійної діяльності; міжнародні стандарти.

Система менеджмента безопасности профессиональной деятельности на предприятиях Украины: международный и европейский опыт

Е. Е. Тверитникова, Ю. Е. Демидова, Т. В. Дроздова

Аннотация. Обзор международный и европейский опыт по созданию и совершенствованию интегрированных систем в области безопасности труда и охраны здоровья на основе исследования нормативных документов Международной организации стандартизации, европейских стандартов, национальных стандартов Украины, отраслевых и методических документов по управлению охраной труда и производственной безопасности предприятий нефтегазового комплекса. Изучены особенности внедрения международных стандартов серии OHSAS 18001 и ISO 45001 по созданию интегрированной системы менеджмента безопасности профессиональной деятельности. Рассмотрены пути внедрения проанализированных требований в отраслевые стандарты безопасности профессиональной деятельности предприятий нефтегазового комплекса Украины. Рассмотрен ряд опасных событий, связанных с профессиональной деятельностью на предприятиях: промышленная безопасность, техногенная безопасность, гигиена и безопасность труда, экологическая безопасность, психофизиологическая безопасность и создан обобщающую схему опасностей и опасных событий. Предложена модель интегрированной системы менеджмента безопасности профессиональной деятельности для предприятий нефтегазового комплекса на основе привлечения научной литературы, нормативно-правовых документов по применению структурно-логического метода, систематизации и обобщения и методов содержательного и сравнительного анализа. Доказано, что система менеджмента, основываясь на принципах циклической модели управления качеством Э. Деминга должна включать такие аспекты, как: управление качеством и рисками, экологическое управление, менеджмент безопасности профессиональной деятельности, социальная ответственность, энергоменеджмент.

Ключевые слова: промышленная безопасность; нефтегазовый комплекс; интегрированная система управления; менеджмент безопасности профессиональной деятельности; международные стандарты.