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ORCID: 0000-0001-8670-8779
Improvement of Mechanisms of Public Administration in Field of Fire Safety as a Complex National Security

Abstract. The article describes the objects of administrative influences from the position of development of the sphere of fire safety. Mechanisms of state management of the fire safety sphere in Ukraine are investigated. The main causes of fires in Ukraine are identified according to experts. Proposals have been made on the necessary changes to the law of Ukraine “On the Fundamentals of National Security of Ukraine”. The proposed scientific and theoretical foundations of mechanisms for the implementation of state governance in the field of fire safety.

It was determined that the state should always act as a reliable guarantor of mandatory liability of organizations operating hazardous industrial facilities, establish criteria for determining the amount of financial security for civil liability for damage caused by an emergency situation related to the occurrence of a fire; introduction of scientifically sound approaches to the assessment of fire damage with the involvement of independent expert organizations; development of the regulatory and legal framework for the implementation of supervisory functions and ensuring the responsibility of managers of enterprises (institutions, organizations) and executive authorities in the field of fire safety. At the same time, it is justified that the main indicators in the state regulation should be considered: the frequency of fires, losses, the costs of measures to prevent and eliminate emergencies associated with the occurrence of a fire and prevented damage.

It is specified that the understanding of the importance of fire safety as a priority component of national security is not very deep in our opinion, is also due to the fact that the losses that result from the occurrence of fires are not always properly calculated. In our opinion, the calculations of only a set of known losses can not expose all the costs that the state and society bear on the results of fires. The most obvious example is the consequences of a fire in the forest.

Keywords: fire safety, state administration, emergency situation, man-made disaster, mechanisms of state administration, national security of the state, ranking of danger.

Удосконалення механізмів державного управління у сфері пожежної безпеки як складової національної безпеки

Анотація. У статті схарактеризовано об'єкти управлінських впливів з позиції розвитку сфери пожежної безпеки. Досліджено механізми державного управління сферою пожежної безпеки в Україні. Виділено основні причини пожеж в Україні. Внесено пропозиції щодо необхідних змін до Закону України “Про основи національної безпеки України”. Запропоновано науково-теоретично засади механізмів здійснення державного управління сферою пожежної безпеки.
Визначено, що держава повинна завжди виступати надійним гарантом обов’язкового настання відповідальності організацій, що експлуатують небезпечні виробничі об’єкти, встановлювачи критерії для визначення розміру фінансового забезпечення цивільної відповідальності за: шкоду, спричинену в результаті надзвичайної ситуації, пов’язаної з виникненням пожежі; впровадження науково обґрунтованих підходів щодо оцінювання збитку від пожеж із залученням незалежних експертних організацій; розвиток нормативно-правової бази з реалізації наглядових функцій і забезпечення персональної відповідальності керівників підприємств (установ, організацій) і органів виконавчої влади у сфері пожежної безпеки. При цьому обґрунтовано, що основними показниками в державному регулюванні слід вважати: частоту виникнення пожеж, збитки, затрати на заходи з попередження та ліквідації надзвичайних ситуацій, пов’язаних з виникненням пожежі, і відвернений збиток.

Конкретизовано, що не зовсім глибоке, на наш погляд, розуміння важливості пожежної безпеки як пріоритетної складової національної безпеки обумовлюється також і тим, що збитки, які виникають унаслідок виникнення пожеж, не завжди розраховуються належним чином. На нашу думку, розрахунки тільки суккупності відомих збитків не можуть покрити всіх витрат, які практично несе держава і суспільство за наслідками пожеж. Найпоказовішим прикладом можна вважати наслідки пожежі в лісі.

Ключові слова: пожежна безпека, державне управління, надзвичайна ситуація, техногенна катастрофа, механізми державного управління, національна безпека держави, ранжування небезпеки.

СОВЕРШЕНСТВОВАНИЕ МЕХАНИЗМОВ ГОСУДАРСТВЕННОГО УПРАВЛЕНИЯ В СФЕРЕ ПОЖАРНОЙ БЕЗОПАСНОСТИ КАК СОСТАВЛЯЮЩЕЙ НАЦИОНАЛЬНОЙ БЕЗОПАСНОСТИ

Аннотация. В статье охарактеризованы объекты управленческих воздействий с позиции развития сферы пожарной безопасности. Исследованы механизмы государственного управления сферой пожарной безопасности в Украине. Выделены основные причины пожаров в Украине по мнению специалистов. Внесены предложения по необходимым изменениям в Закон Украины “Об основах национальной безопасности Украины”. Предложены научно-теоретические основы механизмов осуществления государственно- го управления сферой пожарной безопасности.

Определено, что государство должно всегда выступать надежным гарантом обязательного наступления ответственности организаций, эксплуатирующих опасные производственные объекты, устанавливать критерии для определения размера финансового обеспечения гражданской ответственности за: вред, причиненный в результате чрезвычайной ситуации, связанной с возникновением пожара; внедрение научно обоснованных подходов к оценке ущерба от пожаров с привлечением независимых экспертных организаций; развитие нормативно-правовой базы по реализации надзорных функций и
обеспечению ответственности руководителей предприятий (учреждений, организаций) и органов исполнительной власти в сфере пожарной безопасности. При этом обосновано, что основными показателями в государственном регулировании следует считать: частоту возникновения пожаров, убытки, затраты на мероприятия по предупреждению и ликвидации чрезвычайных ситуаций, связанных с возникновением пожара, и предотвращенный ущерб.

Конкретизировано, что не совсем глубокое, на наш взгляд, понимание важности пожарной безопасности как приоритетной составляющей национальной безопасности обуславливается также и тем, что убытки, которые возникают вследствие возникновения пожаров, не всегда рассчитываются должным образом. По нашему мнению, расчеты только совокупности известных убытков не могут разоблачать всех расходов, которые практически несет государство и общество по результатам пожаров. Самым наглядным примером можно считать последствия пожара в лесу.

Ключевые слова: пожарная безопасность, государственное управление, чрезвычайная ситуация, техногенная катастрофа, механизмы государственного управления, национальная безопасность государства, ранжирование опасности.

**Problem statement.** In modern conditions, the crisis has already reached such proportions that the Ukrainian economy will not be able to cover losses from fires caused by negative processes in the natural and man-made spheres in the near future according to a number of professional indicators and forecasts of Western experts.

This situation is worsening the critical situation in the south-eastern region of our country due to the prolongation of hostilities in order to protect the territory of our state when after artillery or rocket-artillery bombardments there were and continue to occur fires in residential areas and in the enterprises as a consequence of access to them shells and missiles.

In such difficult conditions, the harmonious, stable and safe development of Ukrainian society becomes practically problematic without the purposeful increase of the level and effectiveness of prognostic, preventive and preventive measures that reduce the threat, scale and negative social and economic consequences of emergencies related to the occurrence of fires.

**Analysis of recent researches and publications.** In particular, and enough scientific works are devoted the study the problems of public administration in general and categorical-conceptual apparatus.

In particular, this issue was considered in their scientific works by the following scholars, namely: M. V. Andrienko, V. A. Domanska, L. A. Zhukova, and Yu. H. Koroliuk, S. P. Taranenko, O. O. Trush, M. V. Udod, H. P. Ferdman, O. V. Fedorchak and other.

**Formulating the goals of the article.** The purpose of the study is to analyse existing mechanisms of public administration and ways to improve these mechanisms in the field of fire safety as a component of national security.
Presentation of the main material. The state of any society depends on the level of public administration; therefore, in the opinion of many politicians, scholars and statesmen, the problem of its effectiveness comes to the fore. This statement is particularly relevant for Ukraine. The solution to this problem is a pledge and a prerequisite for solving all other problems of the Ukrainian society, which is experiencing a systemic crisis of governance. Fundamental theoretical and methodological research of the problems of state administration, creation of the developed theoretical base, realized in scientific theories, concepts and projects, is fundamental.

Taking into account the postulated world practice experience that management is an important tool for achieving the goals set before society and for ensuring the well-being of its members, it can be considered that the final conclusive reflection of the activities of society and the state on the generation of proactive actions within the public administration is the process of improving the forms and methods of implementing the mechanisms of public administration [5].

The target orientation of strengthening the mechanisms of public administration in the sphere of fire safety is connected, firstly, with the aim of ensuring the maximum correspondence of managerial influences and coordination actions of state authorities and local self-government with existing needs and laws of the functioning of the fire safety sphere, as well as relevant tendencies and modern conditions; secondly, to form the most rational and effective interconnections between all components of the system of public administration in the sphere of fire safety taking into account the relations between objects and subjects of management; thirdly, maintain in the rational (quasi-optimal) and capable state the organizational structure of the state control system for the field of fire safety for the existing or emerging conditions; in the fourth, to contribute to the dynamics of the gradual reduction of public spending on public administration, using the presidential course on decentralization; fifth, to find more effective and flexible forms and methods, as well as progressive European and world-wide experience in the field of state control of the field of fire safety, especially in the event of possible emergence of significant risks, hazards and threats in the field of fire safety in Ukraine (Fig. 1) [3].

An analysis of international statistics over the past decade suggests a constant increase in fires in the vast majority of countries around the world. The regularity of the fact that with increasing population size by 1 %, the number of fires increases by about 5 %, and the damage from them increases by about 10 %. If we take into account the population growth rate on our planet from 1.6 billion people at the beginning of the 20th century to 5.5 billion at the beginning of the 21st century, then the growth rate of fire danger becomes clear, which is due, first of all, to the increase in the scope of human economic activity and the negative consequences of human use of the results of scientific and technological progress. The combined damage to the fires increases significantly, and the number of victims,
and not only human, increases at the same time. Today, even the most developed economies suffer serious fires from losses: direct losses amount to 0.3–1 % of GDP [2] only.

According to forecasts made on the basis of fire statistics, in the world every year, almost 100 thousand people could die in fires, more than 1 million people could injured, and more than 4 million people could receive severe burn injuries. Material losses from fires amount to tens of billions of the US dollars. The elimination of almost 6 million fires on the planet requires about 300 million m³ water every year only.

In addition, it is worthwhile to note that for further improvement of the mechanisms of state control of the field of fire safety can be divided into external and internal objectives (Fig. 2).

Fig. 1. Objects of administrative influence from the position of development of the field of fire safety

Source: compiled by the author based on [11].

- Regulatory legal support of fire safety; system of training of specialists in the field of 'Fire safety'
- Advanced training system for fire safety
- System of production and service of fire equipment and equipment
- Providing services to the population on fire safety issues
- Fire safety systems in administrative buildings of state authorities and everyday life, etc.

Thus, the more rapidly and faster the world society, science and technology develop, the more dynamic the growth rate of industry, the more urgent is the problem of providing the necessary level of fire safety. It is no exception in this case, and our country, although the number of Ukrainian population, unfortunately, according to the annual statistics, is decreasing each year.

One of the real causes of the fires in our country is the growth of man-made disasters, the probability of which is high due to the maximum exhaustion of resources of equipment and technologies, various tools and equipment manufactured during the Soviet Union’s time and used to ensure human life, as well as the negative impact of human factors to the state of fire safety. Since the year 2005, the danger of various man-made disasters in Ukraine was warned even in 2000 (Table 1) [13].

The sad examples of Ukrainian man-made disasters that were accompanied by fires include: a fire at the warehouses of the 275th artillery shell storage facility near the village of Novobogdanivka of Zaporizhzhia region (2006), when the fire covered an area of about three hectares; the burning of 15 yellow phosphorus tanks, which followed from Ka-
zakhstan to Poland (2007) and turned over near the village of Ozhydov in the Lviv region; fire at the Otradnoie station in poison chemicals storage facility in Dzhankoi district in Crimea (2009), which resulted in the burning down of about 160 tons of pesticides; fire in the city of Svitlodarsk of Donetsk region at the Uhlehorsk Thermal Power Station, the Tsentrenergo state-owned joint-stock power supply company in the second block after the explosion (2013); there was a fire on the oil storage near the city of Vasylkov (2015), explosions in the arsenal of ammunition Balakliia (2017), and explosion of shells near Vinnytsia (2017) [8].

Every day there are about 150 fires, and sometimes more, resulting in the death of ten and injuries of five people, the fire destroys 55 houses and 10 units of equipment in the country on the average. The vast majority of forest fires (90 %) are of artificial origin and fall into suburban areas. It should be emphasized that fire is considered one of the known and very dangerous elements of the world, if it comes out of control.

Table 1

<table>
<thead>
<tr>
<th>№</th>
<th>Causes of occurrence</th>
<th>Percentage ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Careless man’s behaviour with fire</td>
<td>58–60 %</td>
</tr>
<tr>
<td>2</td>
<td>Violation of the rules of installation and operation of electrical equipment and household appliances</td>
<td>18–20 %</td>
</tr>
<tr>
<td>3</td>
<td>Heating appliances</td>
<td>11–12 %</td>
</tr>
<tr>
<td>4</td>
<td>Naughty children with fire</td>
<td>7–8 %</td>
</tr>
<tr>
<td>5</td>
<td>Arson</td>
<td>2 %</td>
</tr>
</tbody>
</table>

Source: compiled by the author
At the same time, the Law of Ukraine ‘On the Fundamentals of National Security of Ukraine’ does not define fire safety in general as a component of national security. This was not fixed at the time and in the law of Ukraine ‘On fire safety’, although the person, material and natural resources of the society are considered objects of national security of Ukraine. They are lost due to fires with the simultaneous deterioration of the state of the environment and the overall ecological situation. As the realities prove the provision of fire-safe living conditions for citizens and society remains unannounced to the priorities of national interests of our state. The attention should be paid to the fact that even the main directions of the state policy on national security are not in any way related to the issue of fire safety at the same time [9].

Due to the existence of this situation, fire safety is perceived by the majority of Ukrainian society at the household level as prevention and extinguishing of fires, and fire safety, as the most important component of national security, is not given due attention from the state institutions only.

Not very deep, in our opinion, understanding of the importance of fire safety as a priority component of national security is also conditioned by the fact that losses caused by the occurrence of fires are not always calculated properly. In our opinion, calculations of a set of known losses cannot expose all the costs that are practically borne by the state and society as a result of fires only. The most striking example is the consequences of a fire in the forest. As a result of a fire, direct losses are calculated in the monetary equivalent only. In addition, if you calculate all costs and losses, then as a result, huge numbers can be obtained, which will exceed many times those that are officially fixed after each fire [4].

In connection with the foregoing, it should be emphasized that the issue of fire safety as a component of national security is not new, but still remains without effective decisions, first of all at the legislative level.

Currently, there are no relevant quantitative indicators and criteria for assessing the level of fire safety, uncertainties with the indicators of national security, the quantitative basis of which, in turn, remains insufficiently researched, although many studies have been published in this area [6].

In order to remedy the situation, it is proposed to return to the issue of the resumption of the Law of Ukraine ‘On Fire Safety’ in the light of world and European experience, as well as to amend the Law of Ukraine ‘On the Basics of National Security of Ukraine’ regarding fire safety as a separate component of the national security of the state (Table 2).

Implementation of the mechanisms of public administration in the field of fire safety from the standpoint of national security requires maximization of the degree of realization of potential opportunities not only of the control facilities, but also of the system of public administration of the field of fire safety in Ukraine. This requires clarification of the essence of the effectiveness of the mechanisms of state control of the field of fire safety. Under the effectiveness of the mechanism of state control of the field of fire safety, it is proposed to understand the extent of its influence on the achievement of the goals set by the
state in the field of fire safety or the degree of use of the potential of the field of fire safety in the formation of situational opportunities [7].

The efficiency indicator of the mechanism of state control of the field of fire safety in a generalized form Кеф can be formalized as a factor of usefulness, reflecting the degree of use of the potential of the field of fire safety:

$$K_{еф} = \frac{C_{т}M}{\Pi_{т}C},$$  \hspace{1cm} (1)

where $C_{т}M$ — Situational opportunities that are realized through the appropriate mechanism in the conditions that are determined by the current or emerging situation in the field of fire safety; $\Pi_{т}C$ — The existing potential of the sphere of the fire safety at the time of the occurrence of the situation.

Effective activity will be considered the activities of government agencies using the appropriate mechanisms that ensure: timely development and adoption of optimal (rational) solutions that are to a great extent correspond to the specific situation in the field of fire safety, the successful implementation of the latter, the achievement of a high degree of implementation of situational opportunities within the existing potential of the field of fire safety.

In order to ensure a high degree of efficiency of public administration in the field of fire safety, it must be carried out in accordance with the require-

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### Table 2

<table>
<thead>
<tr>
<th>№</th>
<th>Article of the law</th>
<th>Required changes</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>To paragraph 9 of the Art. 6 ‘Priorities of national interests’</td>
<td>Make changes in taking into account the fire-safe conditions of life of citizens and society</td>
</tr>
<tr>
<td>2</td>
<td>To the provisions of Art. 7 ‘Threats to national interests and national security of Ukraine’</td>
<td>Add a new paragraph in the direction of the sphere of civil protection of the following content: the deterioration of the state of fire protection of objects and the decrease of the general level of fire safety in the state</td>
</tr>
<tr>
<td>3</td>
<td>To Art. 8 ‘Main directions of the state policy on national security issues’</td>
<td>The direction of the sphere of civil protection, which are associated with an increase in the level of fire safety</td>
</tr>
<tr>
<td>4</td>
<td>To Art. 6 ‘Priorities of national interests’</td>
<td>Provision of environmentally friendly, fire and technogenic safe conditions for the life of citizens and society, preservation of the natural environment and rational use of natural resources</td>
</tr>
<tr>
<td>5</td>
<td>To Art. 7 ‘Threats to national interests and national security of Ukraine’</td>
<td>The deterioration of the state of fire protection of objects and the decrease of the general level of fire safety in the state</td>
</tr>
<tr>
<td>6</td>
<td>To Art. 8 ‘Main directions of the state policy on national security issues’</td>
<td>Raising the levels of environmental, fire; nuclear and radiation safety to the norms and standards in the relevant sphere, including transformation of the ‘shelter’ facility into the ecologically safe system of the Chernobyl Nuclear Power Plant</td>
</tr>
</tbody>
</table>

*Source*: compiled by the author
ments imposed on it, to develop in the light of its specific laws and contemporary world tendencies. This, in turn, requires the availability of both criteria for assessing the effectiveness of the mechanisms of public administration in the field of fire safety, and the implementation of the control function for building information feedback [1].

In our opinion, the ability of managers, officials, other parts of the public safety management system to perform qualitatively management and management functions should be added to the understanding of the concept of ‘State Management of the Sphere of Fire Safety’. This requires the need to formulate a set of requirements for the qualities of leaders (managers) in the system of public administration in the field of fire safety.

An important aspect of improving the mechanisms of public administration in the field of fire safety is the use of a system approach to integrate together a set of measures to prevent, detect and eliminate or mitigate hazards in the field of fire safety and the consequences of emergencies related to fires, irrespective of the reasons for their occurrence (Table 3).

### Table 3

<table>
<thead>
<tr>
<th>Component elements</th>
<th>The main characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laws and theoretical foundations</td>
<td>A set of laws for combating fire during fires; a set of laws of state governance specific to the field of fire safety; theoretical approaches to the reflection of the mechanisms of state control in the field of fire safety; scientific and theoretical approaches to the development and adoption of managerial decisions in the field of fire safety</td>
</tr>
<tr>
<td>Principles</td>
<td>Principles of implementation of the mechanisms of state control in the field of fire safety; principles of the choice of methods; principles of the formation of management decisions in the field of fire safety; a mechanism for the formation and implementation of management decisions in the field of fire safety</td>
</tr>
<tr>
<td>Concepts, mechanisms, and models</td>
<td>Strategy and mechanism of choice of methods; conceptual approach to the evaluation of the effectiveness of the mechanisms of public administration in the field of fire safety; model of self-government in the system of public administration in the field of fire safety; The concept of the implementation of ISO 9001: 2008 the State Emergency Service (SES)</td>
</tr>
<tr>
<td>Terminology</td>
<td>Fire Security; sphere of fire safety; state management of the field of fire safety; mechanism and principle of state control of the field of fire safety; the concept of the formation of requirements for the qualities of the heads of the State Emergency Service (SES) regarding the field of fire safety; conceptual approach to the development of mechanisms of the field of fire safety</td>
</tr>
</tbody>
</table>

*Source: compiled by the author*
At the same time, the development and practical use of this approach does not mean simultaneous and complete elimination or mitigation of all hazards, which is impossible, given the limited human knowledge, technologies, and the most importantly as time and resources. Taking into account these restrictions means the need to rank the dangers, the allocation of the set of priority threats in the field of fire safety.

An effective solution to such a difficult task is possible on the basis of the concept of acceptable risk. The essence of the concept is manifested in the definition of acceptable risk as a compromise, often compelled, between the three parties. Firstly, the state authorities that are authorized to make decisions on fire safety issues. Secondly, the population, which oftentimes differently assesses the extent and severity of the risks arising or existing in those or other regions and districts, and therefore not always satisfied with the actions of the above-mentioned state bodies. Third, business structures and corporations whose objects or activities present a potential or actual threat to the state of fire safety and which, as a rule, have significant opportunities for lobbying their interests in legislative and executive bodies [10].

In our opinion, in general, the concept of acceptable risk may be the basis for the formation of state policy not only in the field of fire safety, but also the basis of the state policy on the protection of the population and territories of Ukraine from any emergency situations that can be made within the limits of the existing the Uniform State Civil Protection System in Ukraine.

The relevant economic mechanisms should be of great importance together with the legal, administrative and theoretical and methodological tools for improvement of public administration in the field of fire safety in Ukraine. The importance of economic mechanisms in the resolution of fire safety issues is manifested not only in the correctness of calculating or predicting losses from fires. More important, in our opinion, is the introduction of effective mechanisms for stimulating practical work on preventing and preventing emergencies related to fires, as well as attracting the necessary investments.

Conclusions. Thus, improvement of the approach to public administration in the field of fire safety in the new conditions of market economy and the transfer of a significant number of fixed assets to the ownership of non-state structures should be carried out, in our opinion, in the following areas: the introduction of economic instruments that promote the implementation of protective measures, strengthening responsibility and the interest of managers of potentially hazardous facilities in reducing the risks of emergencies associated with the occurrence of fires; the development of a set of tax privileges, preferential bank loans, public investment, as well as strict sanctions for enterprises (institutions, organizations) that violate the requirements of fire safety; the development of mechanisms for compensating the population for the losses from the fires from the funds that are to be created and by insurance.

The state must always act as a reliable guarantor of the mandatory liability of organizations operating hazardous production facilities, to establish
criteria for determining the financial security of civil liability for damage caused by an emergency resulting from the occurrence of a fire; introduction of scientifically grounded approaches to the estimation of damage from fires with the involvement of independent expert organizations; development of the regulatory framework for the implementation of supervisory functions and ensuring personal responsibility of the heads of enterprises (institutions, organizations) and executive authorities in the field of fire safety.

The main indicators in the state regulation should be considered: the frequency of the occurrence of fires, losses, costs for measures to prevent and eliminate emergencies associated with the occurrence of fire and distorted damage at the same time.

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4. Аналіз загроз пожежовібушонебезпеки та системи реагування на них /


