Purpose. To substantiate the basic requirements for information and to develop a quality evaluation method of the civil protection information and analytical support system operation in public administration.

Methodology. During the research, a set of general and special methods were used: regular observation and comparative analysis, content analysis, logical generalization, quantitative and qualitative comparison, scientific abstraction and systematization. A quality evaluation method of the civil protection information and analytical support system operation was applied, which led to outlining the quality of information as sufficient, corresponding with situation changes, and significant information for appropriate decision-making by the head of authority under certain conditions.

Findings. The basic information requirements are substantiated and its quality is defined as a set of characteristics (adequacy, completeness, responsiveness and utility) that outlines the degree of its suitability for achieving the goals of the information and analytical support system in civil protection. The quality evaluation method of the information and analytical support system operation in civil protection during emergencies was elaborated; it allows evaluating quantitatively the correspondence of the quality of system operation with the requirements stipulating usage of the integrated indicator – the extent of information and analytical support for the authority concerning its activity arrangement in emergencies. The obtained results of quality evaluation of the civil protection information and analytical support system operation were proposed to determine the rational method of its operation during the decision-making process by the head of authority under certain conditions.

Originality. The evaluation criterion was defined: achieving the condition when the extent of implementing the information and analytical support is higher or equal to the required one and provides for further evaluation of the operation methods of the system.

Practical value. It is proved that attaining the criterion of information and analytical support system operation quality in civil protection is a connecting link to the methodological approach. Therefore, there is a possibility to determine a rational method of the system operation using the hierarchical model of alternative method comparison taking into consideration analytic hierarchy process (AHP), which ensures the head of authority to perform the assigned tasks qualitatively, completely and timely.

Keywords: emergencies, information and analytical support, civil protection, quality of information, system operation, security

Introduction. In recent years, in Ukraine a number of victims as a result of emergencies has shown a need to improve the efficiency of the public authorities’ operation and other forces’ involvement in emergency response. This is closely related to the insufficient scientific and methodological approach to the quality evaluation of the civil protection system operation in general, and its constituent part that is the system of information and analytical support for civil protection, in particular. An extremely important scientific task in public administration is to develop a method for evaluating the performance of the civil protection information and analytical support system (hereinafter – CPIASS). This objective requires a thorough analysis of the civil protection system and scientifically based evaluation of the civil protection information and analytical support system.

Literature review. The issues of complex system evaluation in various areas of the society have received sufficient attention from both foreign and domestic researchers.

Public administration researcher Barylo O. argues that public authorities and officials have to operate in a context of fragmented, unclear, uncoordinated information and high dynamics in a situation of emergency. However, in the author’s view, it is necessary to try to obtain as much reliable primary information as possible even in such difficult situations to make more accurate and adequate decisions and actions. At the same time, the researcher claims that all management information from whatever source is subject to the requirements of relevance, credibility, sufficiency and accessibility [1].

The issues of improving the quality of information and analytical support and the efficiency of managerial decisions were considered by Stepanov V., who proved that for public administration any information should meet the criteria of adequacy, completeness, quality, relevance, timeliness. The au-
The need to set up a system of information and analytical support in the executive branch was proved by Kolomiets Ye., who states that this system provides for the creation of techni-
In our view, the general characteristic of the information is quality which is a set of properties (adequacy, completeness, efficiency, utility) reflecting the degree of information suitability for achieving the objectives by the system of information and analytical support. In the paper, definitions of information quality attributes are provided, namely:

- information adequacy is a feature which reproduces the degree of proportionality of the image which is formed by information to the present object, process, phenomenon. The degree of information adequacy determines precision in emergency decision-making;
- information completeness is a property which means that there is sufficient information to understand the nature of the emergency and to make the appropriate administrative decisions;
- information promptness is a property of data on time of collection and processing and corresponds to the movement of changes in the nature and scale of the emergency;
- information usefulness is an indicator of the information relevance to the outlined task relating to the organization of the work of the civil protection information and analytical support system.

Research paper analysis on the main characteristics of information (Table) made it possible to determine the significance of indicators of the core information properties that contribute to the achievement of the objective of the civil protection system of information and analytical support (Fig. 1).

An integrated approach to evaluating the performance of the civil protection information and analytical support system has made it possible to determine the quality of information as sufficient and appropriate to changing circumstances, as meaningful for rational decision-making by the head of the administrative body in specific conditions.

Based on the processed research, a method for evaluating the performance of the civil protection information and analytical support system in an emergency was developed and proposed for use which is based on the integrated approach to the study of complex systems and on the analysis of the main factors affecting them under the conditions specified.

For identification of the indicators of separate areas of the information and analytical support system, the analytical method was applied, which relies on the relationships described in [8] and used by the authors in the previous research works.

Quantitative measures of the quality evaluation of the information and analytical support system performance are calculated in accordance with the following limitations:

- defining the objective by the highest level of administrative body is provided on time;
- activities carried out prior to assignment have been completed in full and on time;
- the conditions of the emergency area are the same for all parts of the civil protection information and analytical support system.

In the method, the constant input data is:
- circumstances in the emergency zone;
- civil protection forces;
- representatives from the civil protection administration and management system;
- list of activities to fulfil by the administrative bodies during an emergency;
- conditions in the emergency zone;
- time available to carry out the tasks by administrative bodies;
- training of government officials to complete assignments;
- promptness and timeliness as requirements to information and analytical support as a condition to achieve a proper balance between the time required and the time which is at the disposal of the head of administration.

The information that is evolving is as follows:
- the amount of information used by the administrative authorities in an emergency;
- level of equipment of the administrative authorities with the means of automation and communications;
- organizational structure of the administrative bodies;
- the number of information and calculation tasks to be solved by the administrative authorities.

The quality evaluation method of the civil protection information and analytical support system performance enables to determine whether the system performance meets the emergency requirements and to calculate the degree of information and analytical support provided to the administrative body under emergency conditions.

Logical framework of the quality evaluation method of the civil protection information and analytical support system operation in an emergency is shown in Fig. 2.

In cluster 1 of the diagram the input data is generated:

| Cluster | Input data — conditions affecting the operation of the CPIASS |
|---------|-------------------------------------------------------------|
| 1       | Conditions of the area, Administrative personnel, Content of the tasks of AB, Time available to AB, Number of IT and CT, Composition, state and level of equipment of civil protection control system (AB, CP, SS, ACS) |

1. Input data — conditions affecting the operation of the CPIASS

2. Evaluating the adequacy of information

3. Evaluating the amount of useful information

4. Determining the time available

5. Evaluation of the effectiveness of operation of AB ($T_{oa}$)

6. $T_{oa} \leq T_{s}$, $T_{oa} \leq T_{s}$

7. Recommendations on improving the operational efficiency of AB

8. Determining the required level of IAS ($R_{oa}^*$)

9. Determining the level of IAS ($R_{oa}$)

10. $R_{oa} \geq R_{oa}^*$

11. Recommendations on improving the level of IAS

12. Determining the rational mode of the CPIASS operation

Fig. 2. Logical framework of the quality evaluation method of the civil protection information and analytical support system
At the same time, the extent of information and analytical support which is implemented has a boundary of $0 < R_{op} \leq 1$.

In cluster 10, the quality performance criterion of the civil protection information and analytical support system is reviewed that is achieving inequality $R_{op} \geq R_{op}^c$. If inequality is not achieved, in order to improve the rate of the information and analytical support system, some reasons for the lack of correlation between the requirements and the quality of system performance are identified in cluster 11.

Based on certain reasons for inconsistencies, in the same cluster recommendations are developed to modify the input data used in emergency administration and management and for performance evaluation of the civil protection information and analytical support system (cluster 1) with the purpose of its improvement.

If the quality criterion of the civil protection information and analytical support system operation is met, the rational method of the system operation is determined by means of a hierarchical model for the comparison of alternative methods of the system operation based on the method of hierarchy analysis (HIA).

Conclusions.

1. The quality of the operation of the civil protection information and analytical support system during emergency response should be evaluated by the indicators that measure compliance with the requirements to the system. It is possible to quantify the compliance of the system operation with the requirements to it if an integral indicator is used – the extent of information and analytical support for the administrative body.

2. During emergency response, the quality of the civil protection information and analytical support system is subject to the following requirements: adequacy of the information to the circumstances; information completeness and usefulness; efficiency of information processing by the administrative body.

These indicators make it possible to evaluate with accuracy not only the compliance of quality of the performance of the civil protection information and analytical support system with the requirements to it but the usefulness of recommendations designed to improve it.

3. The quality of operation of the civil protection information and analytical support system is evaluated by means of the proposed method, which is introduced in the logical framework containing certain clusters, forward and backward links.

4. The achieved quality of the criterion of the performance of the civil protection information and analytical support system is a link in the methodological approach which makes it possible to determine the rational method of operation of the system by means of the hierarchical model for the comparison of alternative methods of the system operation based on the method of hierarchical analysis, which ensures that the head of the administrative body performs the assigned task in a high-quality, complete and timely manner.

5. The practical application of the proposed method provides for the quality evaluation of the civil protection information and analytical support system daily operation, as well as its work in the modes of high alert and emergency state.

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Информаційно-аналітичне забезпечення прийняття обґрунтованих управлінських рішень у системі цивільного захисту

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Мета. Обґрунтувати основні вимоги до інформації та розробити метод оцінювання якості функціонування системи інформаційно-аналітичного забезпечення цивільного захисту в державному управлінні.

Методика. У ході дослідження використана сукупність загальних і спеціальних методів пізнання: регулярного спостереження й порівняльного аналізу, контент-аналізу, логічного узагальнення, кількісного та якісного порівняння, наукового абстрагування та систематизації. Застосовано метод оцінювання якості функціонування системи інформаційно-аналітичного забезпечення цивільного захисту, що дозволяє визначити якість інформації як достатню, відповідну зміні обставин, значущу інформацію для прийняття доцільного рішення керівником органу управління в певних умовах.

Результати. Обґрунтовані основні вимоги до інформації та визначено її якість як сукупність властивостей — адекватності, повноти, оперативності, корисності, що окреслює ступінь її придатності до досягнення цілей, які стоять перед системою інформаційно-аналітичного забезпечення цивільного захисту. Розроблено метод оцінювання якості функціонування системи інформаційно-аналітичного забезпечення цивільного захисту в надзвичайних ситуаціях, що дозволяє кількісно оцінити відповідність якості функціонування оцінюваної системи вимогам, які до неї передбачаються, за умови використання інтегрального показника — ступеня інформаційно-аналітичного забезпечення органу управління. Отримані результати оцінювання якості функціонування системи інформаційно-аналітичного забезпечення цивільного захисту запропоновані для визначення раціонального методу її функціонування під час ухвалення рішення керівником органу управління в конкретних обставинах.

Наукова новизна. Визначено критерій оцінювання — досягнення умови, коли ступінь інформаційно-аналітичного забезпечення, що реалізується, більший або дорівнює потрібному й забезпечує подальше оцінювання методів функціонування зазначеної системи.

Практична значимість. Доведено, що досягнення критерію якості функціонування системи інформаційно-аналітичного забезпечення цивільного захисту є з’єднувальною ланкою методологічного підходу. Виникає можливість визначення раціонального методу функціонування зазначенії системи за допомогою ієрархічної моделі порівняння альтернативних методів її функціонування на основі методу аналізу ієрархій (МАІ), що забезпечує керівнику органу управління здійснення якісного, повного та своєчасного виконання завдань за призначенням.

Ключові слова: надзвичайні ситуації, інформаційно-аналітичне забезпечення, цивільний захист, якість інформації, функціонування системи, безпека

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