



## NIEKTORÉ ASPEKTY METODIKY VÝSKUMU V OBLASTI BEZPEČNOSTI

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### SOME ASPECTS OF SECURITY RESEARCH OF METHODOLOGY

#### ABSTRAKT

*Papier sa snaží prezentovať metodologické aspekty výskumu v oblasti bezpečnosti spojené s prirodzených a antropogénnych katastrof predstavujú veľkú hrozbu pre bezpečnosť. Hasičské zbory v ťažkých situáciách, sú podporované špecializovanými jednotkami chemickej vojny. Práca ukazuje niektoré aspekty spolupráce medzi zložkami sily ohňa brigádneho úlohového zoskupení a ozbrojených síl pre plnenie spoločných úloh v krízových situáciách. Mnohí vedci a teoretici zaoberajúci sa touto problematikou - rôzne definovaný bezpečnosť - v závislosti na hodnotách kritérií.*

**KLúčové slová:** bezpečnosť, hasičské jednotky, chemické vojsko, ozbrojené sily, dekontaminácia

#### ABSTRACT

*The paper attempts to present methodological aspects of security research connected with natural and anthropogenic disasters pose a great threat to safety. Fire brigades in difficult situations, are supported by specialized troops of chemical warfare. The work shows some aspects of cooperation between the components of the forces fire brigade task force and the armed forces for the implementation of common tasks in crisis situations. Many scientists and theorists dealing with this issue - variously defined security - depending on the criteria values.*

**Keywords:** Security, fire-fighting units, chemical forces, armed forces, decontamination

#### INTRODUCTION

Interoperability of services and administration in cases of natural disasters or man-made is the most important determinant of effective action. None of the formation of government services (probation department, police, emergency medical services, military ...) is not in a position to organize and carry out a comprehensive rescue operations. Only the cooperation of specialized formation (respectively coordinated) allows you to restore the proper state of security of the citizens. The basis of all cooperation are the legal conditions, equipment, training and appropriate (coordinate) the organization of activities.

Taking the issues of cooperation and military firefighters, special attention is paid to the elements that determine their unique role in the security environment. One of them is that they are institutions that exist in virtually every state of the system and the economic system. Each of them is called to perform other tasks, each of which is subject to a different ministry. It should also be noted that both institutions enjoy enormous public trust. Security in today's world is one of the most important needs in normal development of society and its survival. Safety is a state of metastable \* (dependent on many factors), requires continuous (elastic) intervention and vigilance. Disorders of the sense of security can be determined by human activity or by the forces of nature. The risk of accidents is subject to many factors - often beyond the control of man. Actions that are taken after the onset of the crisis requires proper coordination and cooperation of many services and the formations as well as public administration [1].

Fire Brigade and the Army, as a public service, they have different tasks, but in some cases, interact with each other. Are subject to various kinds of institutional changes, reorganization, etc. Efficient organization as a learning organization should be in his philosophy (the doctrine) their readiness to change, such as the need to improve working conditions, improved communication, greater participation in decision making processes. It is therefore necessary to realize that change is not a problem but an opportunity to improve the functioning of the institution. Restructuring to be successful, must have the support and be accepted. Firefighters and soldiers should be a participant and co-authors of the changes. Their experience and knowledge as a result of the practical performance of their duties, they should not be a burden to the decision-making circles, on the contrary should be considered as a support. Same concepts of organization and changes should be firmly rooted in reality, the specifics of the institution. Theory and practice of interaction requires ongoing evaluation and monitoring. Training, and joint exercises improve the emergency services are the key to maintaining a high level of readiness and efficiency in the event of a situation where the fire department is not in a position to implement emergency projects. Support the troops is subject to a number of laws that are designed to ensure the proper use of this formation, which, however, the essential task is to defend the sovereignty and independence of the state. Our equipment and a high level of training can be used in emergency situations.

Effective use of the potential of the fire brigade and the army requires not only the efficiency of the management, but also the appropriate legal and procedural considerations at all levels of the organization. This applies to both formal and legal

\* Metastability is owned subtle imbalances in states (MACs), which exhibit stability for small deviations from the equilibrium position, but at higher deflections cause a change of state and transition to a full-balance or other metastable state.

conditions of individual services, as well as governments at all levels - from the community level and ending with the Government Security Center (GSC).

The development of effective management procedures requires proactive and thorough knowledge of the capabilities of each formation, content and any changes of program documents, procedures, use of best practices and experiences of other institutions and entities Army and Fire Brigade and the actions to which other (sharing) services which indirectly protect critical tasks.

Service "supportive" - Police, Military Police, Municipal Police Sanitary-Epidemiological (SANEPID), Military Preventive Medicine Centers (WOMP) and others, also play an important role in combating the effects of disasters and accidents. They also participate in the training and improvement. The ability to link the tasks of all services and formations require a lot of knowledge and creativity. Reporting and monitoring the effects of joint exercises and training must be based on good organization of work and the smooth flow of information between the various levels of governance.

Rightly so, and even, it seems necessary, therefore, a thorough examination of the issues range interaction Fire Brigade and Military in many fields.

### **Justification of the need to take research - methodological aspects**

Taking into account the fact that the interaction of services and administration is an organizational and technical - the subject of the study was all that consisted of objective reality. These included the crisis phenomena (catastrophe) of natural origin and the events that initiated (the perpetrator) was a man or processes associated with its activities. Investigate also require risk (potential hazard) disaster and/or failure of action taken as a result thereof and external factors related to the interaction of the leading services (fire brigade and specialist sub-units of the army) of the public administration system. Another important factor was the legal conditions that require deep analysis because both formations subject to other Ministers. The consequence of such subordination was the necessity of inter-action. Both the fire department and military detachments operate under other provisions of law: laws, regulations and procedures. Analysis of legal requirements has been carried out based on the legal status of the period in which the circumstances described in the following sections. The subject of inquiry were also organizational structures (components secreted into tasks), their relevance in relation to the situation.

Because all emergency action joined task forces are always connected with the use of technology resources - the main focus is on technical issues:

- compatibility of equipment and facilities,
- the efficiency and reliability of the communication and management,
- efficiency and performance of equipment and tools,
- the strength and operational safety measures to protect against contamination.

Selection of aspects of research related to the practice of which was the fact there was a flood. This example does not cover the entire spectrum of signs of natural and anthropogenic hazards but allows observation of symptomatic phenomena and processes related to disaster management. This gave the opportunity to explore the connections and relationships that occur in the particular circumstances of the real danger.

Joint exercises and training workshops are deprived of, although many elements of the real and the main determinant of risk - which is the passage of time. It allows, however, for an insightful analysis of the various stages of cooperation without the pressure of threats to persons and property. In this study presents the results of research carried out under real threat during floods and exercises on objects and industrial installations for the different risks and measures to restore the security situation.

The main objective of the research study was conducted to analyze and evaluate the effectiveness of cooperation and preparation of selected components of the fire brigade task forces and the army in fighting the effects of natural and anthropogenic.

For so the formulated the main objective were assigned to the cognitive goals:

- Functional analysis of genuine cooperation in dynamic situations (floods, disinfection facilities after the flood),
- Assessment of the compatibility of equipment and communications specialized,
- Comparison systems of training and improvement in terms of cooperation.

To assign utilitarian dimension of the research it was also assumed the implementation of practical purposes - related to the functioning of a crisis management system with all its elements and levels.

Into the practical purposes have been included:

- The comparative analysis of information flow management systems for inter the departmental,
- Generation of factors liable to disrupt performance of the tasks (posing technical and organizational problems),
- Heuristic analysis of factors synergy to improve the implementation of joint activities,
- The wording of postulates to improve the process cooperation during the selected anti-crisis measures.

The main research problem of this study was expressed as a question of problematic:

*Is the current structural arrangements and organizational of the interoperability process components firefighters and army successfully restores an adequate level of safety disturbed as a result of natural and anthropogenic threats?*

For the purpose of the study the following detailed issues were discussed:

- what methods and tools by which research can explore the most effective military cooperation issues with the fire department?

- how natural and anthropogenic hazards may occur in our country?
- is the legal and legislative system is effective in controlling the risks of emergency?
- what conclusions and experiences result from the analysis of the cooperation firefighters and troops to the areas affected by floods?
- whether currently in force model training and firefighters and soldiers to effectively prepare for common tasks?
- what new technologies could be applied to the development of waste solutions that remains after decontamination processes?

Results of the research problem can have a dual impact, that is, can bring a certain and immediate practical benefits in terms of security, for example, to improve efficiency and effectiveness, which shall be submitted to the increased sense of security of the citizens, or may in the future lead to important findings of cognitive science the assumption that these effects remain together in mutual relations [2].

In the case studies explaining the formulation of the problem is not enough for the smooth conduct of research because it is desirable to formulate a hypothetical answer, which is a solution to a given problem or hypothesis.

Hypotheses are a group of the putative answers to the questions. According to Cibangu hypothesis is "... a scientific conjecture as to the existence or absence of a thing or phenomenon in a certain place or time..." [3]. In line with Apanowicz, "hypothesis is nothing but a change in the grammatical form of questions of problematic (the problem in detail, argument) from the sentence asking for affirmative or negative" [4]. However, Marder believes that the hypothesis that any claim only partially justified, and any conjecture, by which we translate the actual data, and therefore also in the form of conjectures and generalizations generated from the output [5].

The hypothesis is a conjecture or guess, for a phenomenon whose explanation requires empirical study, for determining the relationships between variables. As he writes Woźniak [6] working hypothesis gives direction to research. It is the basis for the selection of events to observe and test methods, allows us to understand its purpose, emphasizes the inter-relationships between the observed events by linking them in a chain of causes and effects.

Hypothesis only attempts to explain the facts, but in any case they do not prove that it is based on not only the numerous facts and aims to include all. "The hypothesis put up when the established facts cannot be explained by existing scientific knowledge" [7].

Hypothesis itself is a concept and as such depends primarily on the creativity researcher. Such inventiveness is driven mainly by the imagination and knowledge of the author. To hypothesis could be useful in the study must meet certain methodological requirements, i.e. [ 8]:

- so again, to point to some hitherto unknown aspects examine the facts, processes or phenomena and their conditions,
- new sufficiently to point to some hitherto unknown aspects examined the facts, processes or phenomena and their conditions,
- to such an extent the general to cover all the facts, processes or phenomena concerned,
- conceptually clear, that is expressed in unambiguous terms possible sharp enough,
- free from internal contradictions, that is adapted so that it does not contain conflicting statements other,
- empirically verifiable, that is verifiable, that confirm or refute through ongoing research,

Depending on the set too (problem questions, problems specific) in the literature is distinguished by hypothesis:

- descriptive, which provide the combined occurrence of the phenomena under consideration, processes and other events, and deal with the mutual determination by the phenomenon,
- cause-and-effect relationships, or those that contain the answer to the question about the origin of the studied phenomena.

Due to the level of general theses (problem questions) located in a distinguished research problem:

- general hypothesis,
- detailed hypotheses.

The hypothesis subjected to verification, an examination procedure can be rejected or confirmed.

Preliminary analysis of the literature and identify the problems of research and years of practical experience of the author in this field led to formulate the following working hypothesis:

*"The current organizational solutions and technical of the interoperability process firefighters and soldiers are not enough, and the introduction of changes in the functioning of the training, supply and cooperation with the structures of the public administration will increase the efficiency of tasks in crisis situations"*.

From a working hypothesis and my research emerge partial hypothesis can be as follows:

- crisis situations - such as flooding - force to make quick decisions, which are often spontaneous and not before scheduled scenario (procedure),
- task components emitted from the structure of the Armed Forces depend heavily on the logistic support provided by the public administration municipal level, where material resources are limited and need temporary support to the parent level,
- implements compatibility and organization is satisfactory,
- cooperation with the basic units of public administration at the municipality requires legislative changes,
- personal protective equipment used under conditions of increased pressure had failed to mechanical strength.

The deliberate, conscious and planned research processes allow to reach new - valuable practical and cognitive effects. You can get them by using adequate methods and research tools. Note, however, that the research process must be carried out by such methods, techniques and tools to achieve this through the research objective. Heuristic approach to research has helped solve problems of insufficient information and compensate for their lack of insight and experience verbal[9].

By the method is meant a system of principles and rules allow for such an arrangement to the theoretical or practical activities, to be able to achieve the purpose for which they consciously going. The test method is a procedure (scientific knowledge). It must be consistent with the concept of research and organize the whole examination procedure. Pilch indicates that the test method is "theoretically justified treatment team concept and instrumental broadly covering the whole proceedings researcher, aiming to solve specific scientific problem" [10]. In connection with the interpretation of the method is the test procedure. The study of a problem is to collect specific data source using a variety of empirical data, of which the most common is a survey and interview by questionnaires. The basic principle of the questionnaire and the interview is that the information and the source data are obtained by written or oral answer people who ask the questions plotted. Use of one of the two methods depends on the specifics of a given problem. The correct scientific method must meet the following requirements [7]:

- clarity - the method must have an universal intelligibility,
- unambiguity - the method should exclude the application of the relevant principles of freedom relative,
- the desirability - the method must be subordinated to a purpose,
- effectiveness - the method should ensure the achievement of the intended objective,
- reliability - the method must provide a desired result with a high degree of probability,
- economic efficiency - method should be to achieve the desired result at a relatively least amount of time and resources.

Among the research methods can be distinguished: a monograph, experiment, diagnostic survey, observation, research panels, content analysis, and the method of individual cases. You can call methods that depend on the wealth of research and purpose.

In this dissertation, the method of analysis used syncretic, which is one of the methods of theoretical character, where he studied were special units of the chemical warfare that have been actors in the aftermath of the floods. Moreover, there were used many years practical experience of the author and his research interests in the improvement of performance of sub-units decontamination. For present purposes this study, based on two types of research methods, i.e. the method of theoretical and empirical method. Empirical methods (observation, laboratory experiments, modeling phenomena, diagnostic survey, the study documents) are methods that require immediate overview of examining bodies, proper organization of research and the preparation of appropriate tools. They are used in quantitative research. However, theoretical research methods (analysis, synthesis, deduction, reduction, induction, comparison, abstraction) is a qualitative research method that can be considered in two contexts:

- as a complement to quantitative analysis, taking into account the fact that any number always corresponds to a certain quality,
- as a relatively independent of the state of the quantitative analysis of collected research materials that are not suitable for quantitative analysis, which can be a source of interesting information on a variety of social facts.

A theoretical study aimed to determine the theoretical basis for the development of research concepts and to identify the necessary research tools. The result of theoretical analysis, based on the content of the literature, was the second and third chapter dissertation. Presented in the theoretical assumptions were used in the interpretation of data collected in empirical research, which concluded in the fourth and fifth chapter work. The studies were used, The following test methods:

- the method of analysis of the documents, particularly reports, reports, orders, media reports, and legal acts and normative documents and other documents relevant for the problems in the study, which allowed us to gather the necessary research material,
- method of active observation - made directly by the flooding or joint exercises enable retrospective insight into the processes interact during the execution of tasks by task components,
- the method of situational analysis in the implementation of a SWOT session (weak points of-the strengths of-opportunities-threats), and the so called - Critical Success Factors [3].

Operations research techniques are determined by the choice of the appropriate method and its conditioned [6, 9].

In other words, these are the detailed steps perform a variety of work involved. They allow, for example, to collect and organize the data you need. Result from the nature of the problem and adopted a research hypothesis. As research techniques were used: observation, interviews, surveys, study of various documents. Interview conducted if it is not possible to obtain information or to establish the facts of a given population (population) studies by other techniques. Interview, by T. Pilch, a "conversation examining the respondent or respondents by developed before disposal. It is used mainly to know the facts, opinions and attitudes of the community [10]. It involves collecting data through direct conversation. Interview cognitive provides valuable material. It can be categorized and Uncategorized, public, hidden, individual, collective. To provide the necessary information (data) must be carefully and accurately prepared. Therefore, joining the interview, set the objective and its problems, set detailed list of questions, which were the main content of the conversation, bearing in mind that during a conversation with the respondent to call him to a positive and sincere motivation to expression. In these studies, interviewed public, individual, using a questionnaire, with selected people working in the organizational and military firefighters who

have expertise in this field and extensive experience, and at the same time directed (argued) sub-measures (components of) the real action and joint exercises.

A characteristic feature of survey techniques is how to fill in the questionnaire, where the respondent replies to the questionnaire contained in a written question by selecting or highlighting selected from the cafeteria answer. In conducting surveys, studies and included the desirability of an appropriate form and content of the questions, the correct order of the questions, the right way of the development, verification and evaluation of the response [2].

It is hard to imagine that in the course of solving the research problem does not refer to a single, thematic source documents that are closely related to the problem to be solved. Therefore, the study was expanded to information collected by document analysis. Document analysis is based on ordering and interpretation of the content from the point of the problem (for) the research or the working hypothesis [7]. Content analysis refers to the pre-scientific and colloquial language understanding, which, apart from being communicated intentionally meanings can with what they say and write, to draw the conclusions of the aforementioned kind [8]. In consequence of using technique of content analysis in this dissertation analyzes the content, such as reports and reports of commanders, legislation concerning the organizational structure of the fire brigade and the army, their functioning, reporting on: the implementation of tasks and needs modernization.

Document analysis was based on an analysis of quantitative and qualitative content contained therein. The qualitative analysis was dominated by the analysis of documents, in particular plans, risk analysis and reporting, and legal acts and normative documents and other documents relevant for the problems in the study, which allowed us to gather the necessary research material. Quantitative analysis was the result of empirical studies conducted laboratory technique. It was a combination of statistical techniques. The results were presented in the section on the applicability of new technologies in the management of liquid waste solution.

One of the stages of the research process also sought to identify variables. The variable is present in the basic category of empirical studies during the test hypotheses. It is also any feature, feature, a factor which takes the typical, representative values in the test set. This is what can be observed in every event or phenomenon, a few basic defining characteristics for a given event. These features usually called variables. According to Łobocki, the variables are an attempt to detail the main object of knowledge, the research problems it intends to solve, and working hypotheses, which seeks to confirm or reject [9]. The choice of methods, techniques and tools was largely determined by technical and technological possibilities, time devoted to research and present the results of research. Therefore, it had to be used in the first instance a simple method which were not time consuming, do not require much effort and time, and at the same time reliable. Without the correct choice and accurate methods, techniques and research tools all creative suggestions and proposals could prove inadequate formulations and scientifically unverified, as well as having no practical application.

The study was conducted in a multiple step process related cognitive research and teaching activities and commanding the author. The experience and practice gained through direct participation in the activities of emergency after floods allowed the gathering research material under real threat. Also participating in exercises and joint training with specialized components firefighters was a source of research material. As an officer, Army Chemical author personally participated in many projects, which allowed for direct collection of experiences and research (active surveillance).

This allowed for the divergent handling complex organizational projects. Author led nine research projects in the framework of the statutory activity WSOWL and own research. The subjects of these works closely associated with solving problems related to the partial improvement actions Chemical Forces and their interaction with the Fire Department. A holistic perspective on problems of co-operation also allowed to explore the many aspects related to the activities undertaken under real threat and methodical playing exercises at various stages of conscious limitations established training. Using a research tool that was "Gordon's syntactic" were collected and analyzed information and the design of various organizational solutions. Subject to a detailed analysis of the decision making process at various levels of command and control - which consists in a conscious search for similarities (analogies) between the organizational solution and other alternatives. We studied different - seemingly unrelated issues behind them - the conscious business decision-making process was simulated (managers). This allowed for the easier combining various independent circumstances change stereotypical way of looking at and responding to the phenomenon of bypassing standard procedures (diagrams) and the search for unconventional solutions. Heuristic approach to the implementation of the above method is divided into the following steps:

- 1 putting the problem,
- 2 definition and analysis of the problem,
- 3 the preliminary estimate of the problem,
- 4 the wording of the main problems and issues follow-up,
- 5 analogies direct (first phase),
- 6 analogies hypothetical,
- 7 personal Analogies,
- 8 visual analogies,
- 9 direct analogies (second phase),
- 10th morphological analysis,
- 11th generated solutions,
- 12th new points of view.

Applied research techniques and research tools allow for comprehensive knowledge of the issues of cooperation components firefighters and soldiers during action in emergencies - floods and decontamination processes. In terms of ecology, a number of empirical studies on the use of new technologies in the management of waste solutions.



## Summary and conclusions

The issue of crisis management is considered by many institutions and scientific research centers. Since in this process there are many variables (factors of unforeseen nature) there is a need for continuous monitoring and flexible countermeasures. Extremely important for the decision-making process is an adequate flow of information and selection from levels of management to levels of executive and vice versa.

In conclusion it can be stated that original purpose is fulfilled research has been achieved. The methodologies used and research tools have allowed the author to thoroughly examine all an aspects of cooperation. In the opinion of the author working hypothesis and sub-hypotheses were confirmed in the course of research and analysis. Research problems which have been presented in this article seems to be have been resolved and described in the publications of scientific articles, reports, and reports from the research.

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### **RECENZIA TEXTOV V ZBORNÍKU**

*Recenzované dvomi recenzentmi, členmi vedeckej rady konferencie. Za textovú a jazykovú úpravu príspevku zodpovedajú autori.*

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*Contributions published in proceedings were reviewed by two members of scientific committee of the conference. For text editing and linguistic contribution corresponding authors.*