

## Organizational and Technological Backgrounds of Project Configuration Management for Firefighting

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**Summary.** The structure of firefighting projects was solved. There was justified that the central place in them belongs to appropriate technological processes. Temporary technological systems create for doing these processes. The place and the role of processes of technology management processes and projects management of firefighting were determined. There was solved their differences and the systemic influence on value indicators of these projects was justified.

It's proven that the purpose of firefighting projects has been achieved through the coherence of the nomenclature and resources amount which are included in these projects configuration and configuration objects of the combustion (heat sources). The coherence of these configurations allows to realize firefighting projects timely with minimal and technological rates of human, technic, material and energetic resources.

The interrelation of processes for project management works, which are predetermined by firefighting technologies, and the configuration of these projects were solved. The question of their initiation and planning on the base of the forecasting for value indicators of temporary firefighting projects was considered. These projects use the analysis of existing statistic information, physic modeling and chronometric of project works.

Projects management configuration of the improvement for regional existing systems of firefighting is based on results of the determination for value indicators of temporary firefighting projects for objects of the combustion. The process of projects management configuration of the improvement for these systems provides the satisfaction by them four main organizational and technological requirements of temporary firefighting projects.

**Key words:** firefighting, projects, management, configuration, organizational and technological backgrounds.

would to some extent meet the aforementioned requirements, is one of the urgent problems of fire protection. Each of effectively direct for the reform system of firefighting. This search must satisfy, to some extent, mentioned requirements. Its solution requires the development of new approaches as to creating a functioning firefighting systems, and so to mentioned projects management, in particular, to their configuration management.

### THE ANALYSIS OF RECENT RESEARCHES AND PUBLICATIONS

Project configuration management of the creation and functioning for firefighting systems were not subject areas of special investigations. Well-known scientific works in the field of the configuration management for these systems provide an answer in regard to their technical and technological parameters [1-15]. Although these results are important for the problem solving to reforming the firefighting system, they do not relate to the configuration management process of appropriate projects, and therefore does not allow to create some tools (methods and models) for this management.

The analysis of recent publications [6-15] and standards [16-21] in projects configuration management and products configuration management allow us to conclude that they are important for managers because their activities are oriented on the synchronization (alignment) of configuration projects and their products. For this purpose, the corresponding process was developed [7, 8], and also basic methods and models for its implementation in practice were disclosed too. In particular, it pointed out that the product configuration model is the basis for the determination of the content and project works (actions), which require a specific type of technical means. These means related to the components of project and technological structures. The developed method of justification for their configuration provides for implementation of the alternative project works and the application of alternative technical means [19]. These results are important for our research, because the combustion of different materials can be in different conditions, and so appropriate firefighting operations require the using of different methods and extinguishing agents. However, the using these results for solving problems of projects configuration management for firefighting can be only conceptually. The configuration of project and technological structures should be justified, taking into account the existence of their alternatives.

### INTRODUCTION

Project Configuration Management is one of the important areas of project management knowledge, from which greatly depends on their success [1]. Especially it concerns production and technological projects, which include firefighting projects. There is an appropriate system in Ukraine today. Its structure and functions do not fully meet the modern requirements of territorial and administrative reform in the state. One of the actual problems of firefighting protection. The search for effective ways of reforming the system of fire, which

According to other organizational and technological features of this management, they should also develop (to justify).

Thus, if we analyze scientific papers [8, 17, 19], standards and practical guidelines for projects configuration management and products configuration management [2], we can come a conclusion, that their results are important for our research, but they have no information about the impact of organizational and technological conditions on features of projects configuration management. They don't discover scientific and methodological basis for determining cause-effect relationships among the organizational and technological characteristics of fires and rational parameters of projects configuration for firefighting.

OBJECTIVE

Task assignment is to find out organizational and technological backgrounds of project configuration management for firefighting.

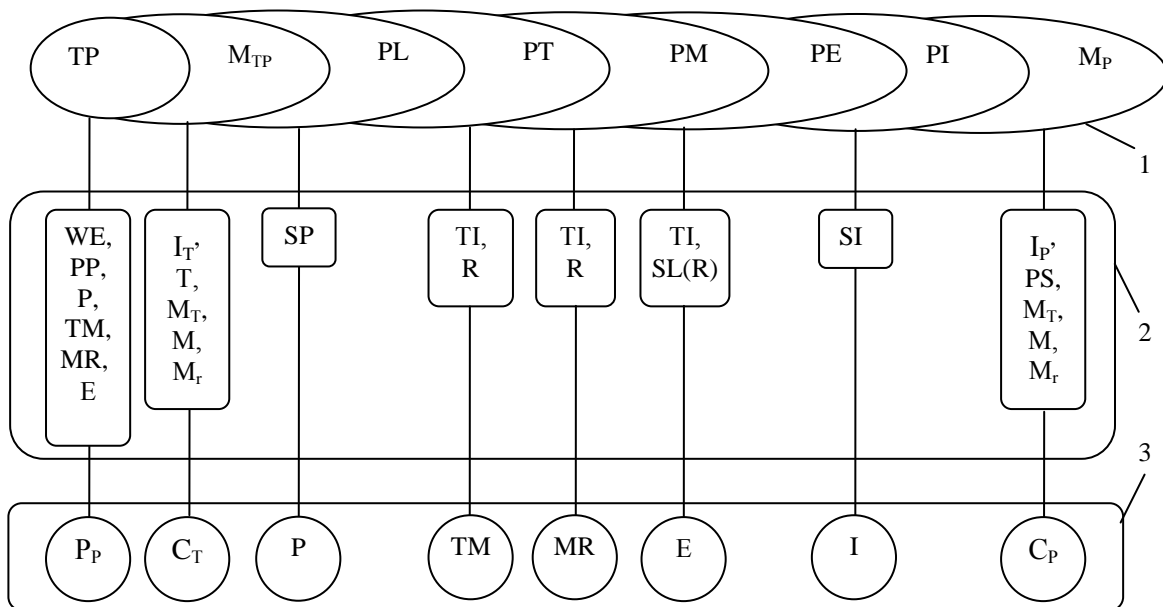
THE MAIN RESULTS OF THE RESEARCH

Firefighting projects consist of many components. Their main base (main component) is technological processes (TP) of firefighting. Appropriate technological systems (TS) temporary form for doing these TP.

Technological systems provide the quality transformation of labour objects – extinguishing of the heat source (fires). These systems are temporary. They are made for a period of the extinguishing this or that fire (heat source).

Quality transformations of labour objects form on appropriate technology – knowledge about nomenclature, content, sequence and continuance of the execution for technological operations. Furthermore, technologies often provide the availability of information about technical means with the help of which separate technological operations are performed. They also provide the availability of operational labour-intensive, the power consumption and material and technical means. To ensure the effectiveness and the quality of doing TP for firefighting, the managing is carried them out, which lies in the observance of developed organizational and technical regulations in advance.

The management of TP for firefighting, on our mind, can't be considered apart from the managing of appropriate projects for the functioning of temporal TS for firefighting. We can't also make progress in the managing of these projects without the quality of the TP management for firefighting. It is very important to consider these two managing processes autonomously. It is very important for making a maximal success with each of them, which eventually provides the reciprocity of maximal value indicators for appropriate projects in results of the conformance for their rates. It is important to note that projects management of the functioning for TS firefighting is systemic.



**Fig.** Approximate structure of the project functioning for TS of firefighting (1), main functional components (2), provision of appropriate processes and their results (3): TP, M<sub>TP</sub>, PL – technological processes, management of technological processes, processes of provision for performers (life-savers), PT, PM, PE, PI, M<sub>P</sub> – processes of provision for technic, materials, energetic resources, finance and informative resources, and processes of appropriate project (projects) management, WE, P<sub>p</sub>, P, TM – working environment, products of a project, performers (firemen/life-savers) and technical means, MR, E, I – material resources, energetic resources and informative resources, C<sub>T</sub>, C<sub>p</sub> – commands of execution for technological processes and project (projects) processes, I<sub>T</sub>, I<sub>p</sub> – information about the progress of technological processes and project (projects), T, PS, M<sub>T</sub>, M, M<sub>r</sub> – technologies, project standards, management tasks, methods of their solution and managers, SP, SI, TI – ensuring systems of performers, information, and transport infrastructure, R, SL – roads and service lines

Every TS firefighting can simultaneously realize many projects which based on appropriate TP. Every project can include one or many TP, which formulate its foundation (core).

So every project of the functioning for TS can show diagrammatically as an appropriate hierarchical structure (Fig).

The important basement of the dedication for appropriate project (resources interaction) is the coherence of nomenclature (type) and capacity resources with the configuration of the heat source (fire object), which is effect with the help of the doing for the appropriate management process. This process is realized as part of general process for project configuration management of TS functioning in the theory of project management.

So we must always solve scientific and industrial task during the functioning of any TS for firefighting. We must realized the appropriate project over definite time and we must quench the heat source (firefighting object) very fast with minimal technological, technical, material and energetic resources which are needed for human rates. So with the help of these manufacturing and technic conditions, projects will be characterized by the biggest (best) value.

If we analyze technological and resources bases of the dedication for projects of the functioning (firefighting) temporary TS, we can say that technological dedications determine the content and the execution time of main project works, and resources determine the configuration of these projects. Taking into account this specificity, tasks of management works (content and time) and projects configuration of the TS functioning for firefighting must be considered first in the hierarchical system of knowledge in appropriate projects management. In general terms, we can see main management processes which determine projects configuration (structure). These projects are realized by these TS.

If we consider the problem of operative forming for TS of the combustion for the target heat source, we can see that the base of these project works is the management process of their initiation which is determined by forecasting concern of value indicators as a project configuration of systems creation such as their functioning. In this time, the forecasting of these markers can be only with the help of the information existing about the configuration of fire objects, mass condition of its heat source, and about forecasting of value indicators for appropriate firefighting project with different variants of its configuration.

Obviously, the reciprocity of some forecasting information can be only with the help of the appropriate information system, and with the help of the modeling for TS firefighting which have the information about the nomenclature (structure) of fire (heat sources), laboriousness and energy expenditures, labour and material resources in firefighting projects (functioning) and the creation of these systems. So if we want to forecast value indicators of project creation and the functioning of temporary TS rightly (objectively), we must have the information about works which are done in them, and about resources which are important for that. If we don't go into particulars of the process for works

forecasting and resources in these projects, we can note that they are evaluated not only in initiation processes but in the planning. Results of appropriate assessment (forecasting) for value indicators in initiation processes are used for works management in planning processes and the project creation and the functioning of temporary TS for firefighting.

We must take note of the information reciprocity (facts) about works in projects of temporary TS for firefighting too, because the configuration of these projects formulates on the base of existing fire stations. The information about project works of future (temporary) TS is mostly based on the analysis of the statistical information about last firefighting, their modeling, and the chronometric works in appropriate projects. Specified scientific and methodological basis of forecasting indicators for project value of firefighting for made temporary TS are the base of management works (content and execution time) and the configuration in these projects. In this time, we must consider that the needed configuration and needed works in temporary firefighting projects are formed and created on the base of available resources of regional systems for firefighting (RSF), and the argument of their configuration is the one of the basic task for the firefighting security. The base of its solution is the process of the coherence for the configuration of strategic projects for RSF and technic projects of the functioning for temporary firefighting TS.

We must not only consider the process of management works and the configuration in projects of the functioning for temporary TS, but also we must determine cause-effect connections between these works and projects configuration of the perfection for existing RSF for the deep determination of the process for the configuration coherence of mentioned projects. In this case, we must point out that works in temporary firefighting projects are determined the nomenclature and characteristics of objects configuration for TS of firefighting, and the configuration and the difficulty of fire objects. So value indicators  $\{Y_p\}$  of projects for the functioning of temporary TS are the result of their configuration  $\{G_{np}\}$ , the condition  $\{S_o\}$  of the heat source in the moment of the beginning for its firefighting, and the configuration  $\{G_{oz}\}$  of fire objects:

$$\{Y_p\}=f(\{G_{np}\}, \{S_o\}, \{G_{oz}\}). \quad (1)$$

In this formula the condition  $\{S_o\}$  and the configuration  $\{G_{oz}\}$  are organizational and technological characteristics of fire objects (fires). The configuration management  $\{G_{np}\}$  of firefighting projects is reduced to its coherence with  $\{S_o\}$  and  $\{G_{oz}\}$ . In this context, value indicators  $\{Y_p\}$  achieve to extreme meanings:

$$\acute{O}_\zeta : \{G_{n\acute{o}}\} \leftrightarrow (\{S_o\}, \{G_{i\acute{a}}\}), \{\acute{O}_\sigma\} \rightarrow exstr \{Y_p\}. \quad (2)$$

So we must take into account that the condition of the coherence for projects configuration of firefighting with organizational and technological characteristics of fire objects (fires) can be with the help of the right management for the content and the execution time of these projects.

The provision of the condition (2) in the process of projects management configuration for firefighting can be with appropriate resources in the state system of firefighting which consists of many RSF. If we don't deeply analyze the appropriate configuration of separate RSF, we can conceptually prove main organizational and technological requirements to their functioning which must be satisfied the improvement base of their configurations (structures). Firstly, RSF must have such configuration which can ensure the mentioned timeliness of the projects configuration realization  $\{G_{np}\}$  of firefighting (temporary TS). Secondly, reserved material resources (firefighting means) with the nomenclature and amounts in every RSF must respond to fire risks. Thirdly, these resources must be territorially stored as close as possible to these risks. And fourthly, territorial zones of each RSF action must be proven in such way that the differentiation of rate indicators for their firefighting security would be minimal.

### CONCLUSIONS

1. The implemented technological analyze of firefighting projects has been allowed to solve their structure and find process functions of technological processes management and appropriate projects management which are in the systemic connection.

2. The purpose of firefighting projects can be achieved through the coherence of the nomenclature and resources amounts with the configuration of fire objects which are the base of these projects configuration management.

3. The process of projects management configuration for the improvement of active regional systems for firefighting is based on the cause-effect relationship between the configuration of these systems and the configuration of firefighting projects.

4. Four main requirements of temporary firefighting projects to the projects configuration of appropriate regional systems are the organizational and technological base for their configuration management.

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организационно-технологических требований, временных проектов пожаротушения.

**Ключевые слова:** пожаротушение, проекты, управление, конфигурация, организационных и технологических особенностей.

#### ОРГАНИЗАЦИОННЫЕ И ТЕХНОЛОГИЧЕСКИЕ ПРЕДПОСЫЛКИ УПРАВЛЕНИЯ КОНФИГУРАЦИЕЙ ПРОЕКТА ДЛЯ ПОЖАРОТУШЕНИЯ

*Александр Щербаченко*

**Аннотация.** Была решена структура проекты пожаротушения. Было обосновано, что центральное место в них принадлежит соответствующих технологических процессов. Временные технологические системы для выполнения этих процессов. Место и роль процессов, процессов управления технологии и управления проекты пожаротушения были определены. Было решено их различия и системное влияние на показатели стоимости этих проектов был оправдан.

Доказано, что целью пожаротушения проектов был достигнут благодаря слаженности номенклатура и объем ресурсов, которые включены в эти проекты и конфигурации объекты конфигурации сгорания (источников тепла). Согласованность этих конфигураций позволяет осуществить своевременную проекты пожаротушения с минимальными и технологические показатели человека, технике, материальных и энергетических ресурсов.

Взаимосвязь процессов управления проектных работ, которые определяются противопожарных технологий, и конфигурация этих проектов были решены. Вопрос об их инициации и планирования на основе прогнозирования стоимостных показателей временные проекты пожаротушения считался. Эти проекты используют анализ существующей статистической информации, физико-моделирования и хронометрические проектных работ.

Проекты конфигурации управление совершенствование регионального существующих систем пожаротушения основывается на результатах определения индикаторов стоимости на временные проекты пожаротушения для объектов горения. Процесс управления конфигурацией проектов совершенствования этих систем обеспечивает удовлетворение их четырех основных