Восточно-Европейский
ЖУРНАЛ
передовых технологий

Eastern-European Journal of Enterprise Technologies

Східно-Європейський
ЖУРНАЛ
передових технологій

- Control processes

6/3 (108) 2020

Content

CONTROL PROCESSES

Establishers
PC Technology Center
Ukrainian State University of Railway Transport

Publisher
PC Technology Center

Editorial office's and publisher's address:
Shatilova dacha str., 4, Kharkiv, Ukraine, 61145

Contact information
Tel.: +38 (057) 750-89-90
E-mail: c7508990@gmail.com
Website: http://www.jet.com.ua, http://journals.uran.ua/eejet

Journal Indexing

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Свідоцтво про державну реєстрації журналу
КВ № 21546-11446 ПР від 08.09.2015

Атестовано
Постановою Президії ВАК України
№ 1-05/2 від 27.05.2009, № 1-05/3 від 08.07.2009
Бюлетень ВАК України

Наказом Міністерства освіти і науки України
№793 від 04.07.2014

Наказом Міністерства освіти і науки України
№ 612 від 07.05.2019
Категорія А

Підписано до друку
08.12.2020 р.

Формат 60 × 84 1/8.
Ум.-друк. арк. 10,25. Обл.-вид. арк. 9,53
Наклад 1000 екз.

UDC 005.8
DOI: 10.15587/1729-4061.2020.219361

DEVELOPMENT OF MODELS FOR SEGREGATION OF INFRASTRUCTURE PROJECT MANAGEMENT ELEMENTS USING A MONO-TEMPLATE IN SAFETY-ORIENTED MANAGEMENT

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A comprehensive study of the process of decomposition and segregation of infrastructure project management elements using a mono-template under the influence of changes and safety-oriented management was carried out. The use of project, program and portfolio management tools made it possible to generalize the process of structural decomposition of infrastructure projects and features of segregation of management elements using a mono-template and provisions of safety-oriented management. This is important because of the peculiarities of the formation and planning of infrastructure projects: content, structure requirements and values, among which safety is the key. Thus, a conceptual schematic model of a mono-template in safety-oriented management is developed, which includes three blocks of project management. This made it possible to improve the planning process of infrastructure projects. The schematic model is developed and the application of the filter system of elements and parameters of infrastructure project management in safety-oriented management is proposed. The system allows carrying out the process of segregation of the necessary elements and parameters of infrastructure project management with the use of a mono-template. The influence and consequences of application on the basis of project parameters are described. A formalized model of the segregation process of infrastructure project management elements and parameters at the level of a mono-template in safety-oriented management is presented. The process of transition of structurally decomposed management elements and parameters through the filter system is described. In the course of this process, the project factors of proactive management, internal project environment, changes and system resistance affect the formed structurally decomposed blocks of a mono-template. The models developed in the study complement the project management tools and provide an opportunity to carry out the process of planning infrastructure projects at a high-quality level

Keywords: infrastructure project, segregation, filter, impact of changes, project decomposition, safety-oriented management, mono-templates

Received date 21.10.2020
Accepted date 01.12.2020
Published date

1. Introduction

The impact of a turbulent environment of dynamic changes in human life, the growing number of emergencies and events form and exert a critical load on critical infrastructure systems and infrastructure projects. In particular, over the last decade, a number of large infrastructure projects have been realized and are being implemented in Ukraine alone. Among them: “Construction of a new Beskidy tunnel”; “Building of a new safe confinement”; “GO Highway”; “Liquid radioactive waste processing plant”; “3G and 4G technology implementation projects in Ukraine” and others. Today there are various standards of project management, models and methods of project planning and implementation are developed and tested. However, the state of affairs indicates that existing standards, models and methods can no longer fully balance the quality, safety and viability of the environment and project stakeholders.

Therefore, there is a need for synergy of existing knowledge in order to develop a new paradigm for detailed structuring of infrastructure projects, develop mono-templates and segregate elements in the planning, implementation and operation of such projects at different levels and stages. There is a need to take into account the dynamics and impact of changes, the interaction of the environment and the multi-parametric environment of the project using safety principles and safety-oriented management. Thus, the study of the process of segregation of management elements in the application of infrastructure projects mono-templates and the development of their models with an assessment of the impact of changes and safety-oriented management is an urgent task.

2. Literature review and problem statement

Research on scientific and practical approaches to project, program and portfolio management is now actively conducted by scientists around the world. The developments supplement and form new standards and methodologies in the field of project management, in particular the study of project management processes, their structural decomposition, choice and selection of management elements and generalize the issues of change management. However, in their work, scientists focused on the basic study of project management in the field of project decomposition, selection of management elements, the impact of changes on the project, the development of models and mechanisms for project-oriented management.

In particular, [1–3] explored the issues of mental space of projects as an environment for intelligent data collection, mobility and flexibility of projects that underlie the success of projects and programs, organizational maturity of projects, as well as the development of the creative potential of project managers: definition of research components and results, but these results are not fully adaptable to the selection of infrastructure project management elements.

In [4], the problems of priority management of ICT projects in the program of organizational development in complex dynamically changing conditions and search and formation of new approaches to project, program and portfolio management in conditions of uncertainty are investigated. However, the influence of such variables on the development of infrastructure projects with the application of mono-templates is not described [5].

An important element of project management is risk management, in particular the development of methods for optimal occupational risk management in the implementation of projects, programs and project portfolios. However, when planning infrastructure projects and segregating management elements, occupational risks are not the main type of risk that should be taken into account [6]. Also important is the study of breakthrough competencies in the management of innovative projects and programs and competency control in the management of IT projects, partial provisions of which can be adapted for use in infrastructure projects [7, 8]. In [9, 10], a study of the process of modeling stakeholders' participation in team management in a multi-project project and peculiarities of the method of forming the project management methodology is carried out. But the process of their interaction in infrastructure projects is not described.

In [11, 12], the process of optimizing the tasks on protection of information and communication transport systems and the possibility of forming a generalized information model of an object is investigated. However, the features of structural decomposition of infrastructure projects and their unique set of management elements are not considered in the optimization. A change management model is also developed, its application in software development projects is described, and approaches to project change management based on project configuration management for developing complex projects are proposed, but these approaches only partially take into account the configuration features of infrastructure projects [13, 14].

The works [15, 16] describe the study of the project information management process based on the construction of information models and construction information and the development of a product-project model based on a project-oriented approach to planning WBS structures in complex project systems. But fully integrating these results for the decomposition and construction of an infrastructure project mono-template is problematic. The issue of safety-oriented management of stakeholders in civil protection projects is described in [17], but the possibility of application in the planning of infrastructure projects is not described. Problems of change management in complex projects in the context of configuration and information management are described in [18]. General provisions of project decomposition and application of work distribution structures to the project management life cycle are described in the works [19, 20], but they do not take into account the impact of project changes in the process of segregation of project management elements.

Having reviewed the research and the results obtained, we can say that they do not fully or not at all address the issues of planning, the impact of changes, structuring and decomposition of infrastructure projects.

3. The aim and objectives of the study

The aim of the study is to develop models for segregation of infrastructure project management elements using a mono-template in safety-oriented management, taking into account the turbulent project environment and the possible impact of changes on the project at different phases of the life cycle. This will make it possible to plan infrastructure projects at the practical level using mono-templates and segregation of management elements and parameters.

To achieve the aim, the following objectives were set:

– to conceptualize the infrastructure project mono-template in safety-oriented management;

– to develop a schematic model of the process of applying filter systems for elements and parameters of infrastructure project management in safety-oriented project management;

– to formalize the process of segregation of elements and parameters of infrastructure project management at the mono-template level in safety-oriented management with the model presentation.

4. Materials and methods of studying the process of segregation of infrastructure project management elements

Infrastructure projects are complex projects, and today are implemented in all spheres of human life, including critical infrastructure facilities. These facilities, under the influence of various projected and unpredictable factors, can pose a threat and have a negative impact on the safety and livelihood of people. Therefore, such facilities are subject to special project requirements, in particular for design, implementation and operation.

The complexity of infrastructure projects lies primarily in the complexity of implementation, their multi-factor and multi-criteria nature, complex process of planning, decomposition and consideration of various factors, turbulent changes constantly affecting the project. Solving the problems of infrastructure project implementation requires a clear decomposition of the type of project, systematization of knowledge and carrying out a comprehensive generalization of elements on the basis of a project-oriented approach. They form a multi-criteria environment for safety-oriented decomposition management of the infrastructure project. It is necessary to develop a conceptual model of the infrastructure project mono-template, adapted for use in the planning of mono, mega and meta-infrastructure projects. It is also necessary to create a formalized model of segregation of infrastructure project management elements at the level of the project mono-template in safety-oriented management by applying a system of project filters. The implementation of a set of measures will allow for a more detailed and high-quality process of decomposition and planning management of infrastructure projects, ensuring their support at different stages of the life cycle.

In solving scientific problems, the method of system analysis was used in order to study the subject area of the process of infrastructure project decomposition under the influence of changes, analysis of known models and development of new ones. Modeling tools – to formally represent the cause and effect relationships of project environment elements. Analysis of the terminology base of project, program and portfolio management – to determine the compliance of the terminology and provisions used with project management standards. Proactive and reactive management methods – to assess the possibility of predicting project development and responding to deviations. Expert evaluation method – to determine the key elements of the infrastructure project mono-template.

5. Results of studying the process of segregation of infrastructure project management elements using a mono-template in safety-oriented management

5. 1. Formation of the concept of infrastructure project mono-template in safety-oriented management

The formation of prerequisites for the successful implementation of infrastructure projects involves a set of priority measures for project decomposition of the infrastructure project with the distribution of project resource costs and taking into account the parameters of the impact of safety-oriented management.

The structural decomposition of the infrastructure project lies in the plane of a clear division of organizational structures at the micro and macro levels. This, in turn, requires the identification of existing hierarchical dependencies, taking into account the parameters of the impact of project changes, turbulent project environment, which in turn affects the project resources at different stages of the life cycle. Resource costs of infrastructure projects, unlike typical projects of other classification purposes, in most cases will be higher due to the consideration of project safety parameters during planning. However, increasing the cost of the project will provide normal conditions for the project operation and safe living conditions for people.

Given the above, we argue that in the process of analyzing the constituent parameters of infrastructure project management and structural decomposition at the planning stage, an important step is the combination of aggregate factors of project management in a single unified system. It includes the identification of the dependencies of project parameters, core functioning and the impact of the turbulent project environment. Thus, based on the system analysis, we formed a generalized model of safety-oriented management of infrastructure project structural decomposition [21–24].

The core of the infrastructure project is a multi-criteria, multifunctional system of control and management decisions, which forms the basic structure of the project in the form of a mono-template of a typical project, taking into account the parameters of project management. Control and management decisions are made at different levels and sublevels of the system, which are formed as a result of structural decomposition of the infrastructure project into organizational structures, blocks, and elements of project management. In most cases, the existing organizational structures will have cross-links, which will have a positive impact on the implementation of projects. This is due to the reduction of the load of the project management system on the processing of input parameters and variables, and will meet the resource needs of the project and maintain its time parameters, implement safety standards at all stages of project planning and implementation.

Safety standards for infrastructure project management are ensured by the application of provisions and tools for safety-oriented project management, where safety parameters are set at the same level, or above quality, time and cost. These include the safety of project participants, stakeholders, performers, users, the environment, and more. The set of components of infrastructure project management includes the possibility of applying the elements of proactive and reactive management, responding to changes and managing them, applying risk management provisions, etc. Moreover, their number is not limited to any of the levels of the generalized model of safety-oriented management of infrastructure project structural decomposition.

Studies of the implementation of complex projects have indicated a number of features and fundamental differences that accompany projects in their planning and practical implementation. Detailed planning of infrastructure projects lies in the application of a certain type of "project standards", "project form" or "project mono-template".

The infrastructure project mono-template is a clearly decomposed, based on the analysis of typical implemented projects, structure of the basic project parameters, which allows optimizing the project planning process. In the process of applying the mono-template there is a need to take into account the conceptual features of project planning and the formation of its unique parameters and elements. However, it should be borne in mind that such parameters and elements may differ depending on the level of the project, its location and many other parameters and factors of the project environment. For example, the infrastructure project "GO Highway" between Poland and Ukraine. In its implementation, a typical mono-template for road construction and logistics interchanges was used. Since the implementation of infrastructure projects for road construction and logistics interchanges has a typical structure, the technologies and implementation approach used allowed optimizing the project planning process. Because it was not necessary to invent the principles of building roads, interchanges, technical means in the process of project planning. It is only necessary to take into account regional features, the state of the turbulent environment, the project environment and its scale.

Thus, a conceptual schematic model of the infrastructure project mono-template is formed (Fig. 1). It schematically visualizes the structure of building the infrastructure project mono-template with a detailed representation of management levels and elements and interaction.

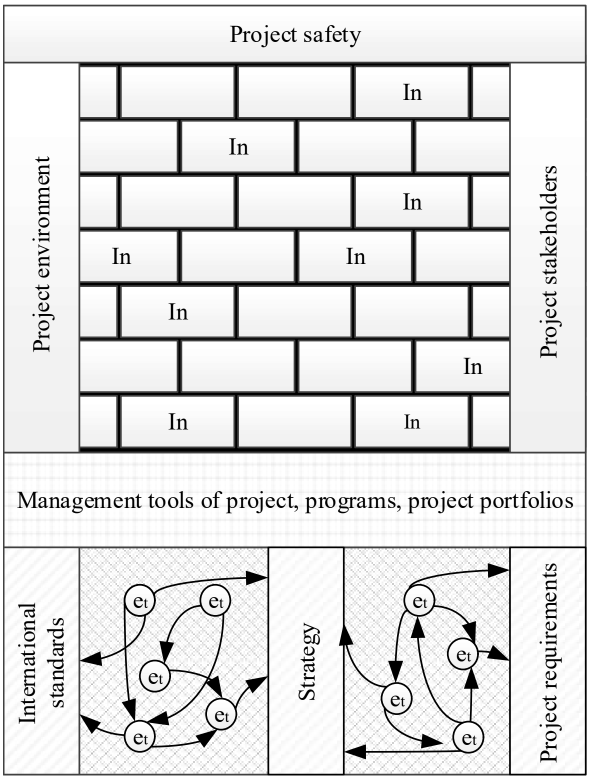

Fig. 1. Conceptual schematic model of the infrastructure project mono-template: *In* – block of structural decomposition of the infrastructure project; e_t – turbulent environment of the infrastructure project

The schematic model can be divided into 3 formal "fundamental", "instrumental" and "compositional" levels.

The fundamental level of the conceptual model of the mono-template is the basis of the infrastructure project mono-template, as it is formed of the basic elements that form any project. These include the requirements of current project management standards (PMBOK, P2M, PRINCE 2) [25, 26], and the application of the principles of Agile-management methodology), the strategy of a particular infrastructure project, project requirements and the impact of the turbulent project environment. Formally, this can be written by expression (1)

$$L_1 = \langle Lt; Ls; Lr \rangle, \tag{1}$$

where L_1 – "fundamental level" of the conceptual model of the infrastructure project mono-template; Lt – standards of project, program and portfolio management; Ls – infrastructure project strategy; Lr – infrastructure project requirements.

Moreover, the influence of the turbulent project environment will be written by expression (2).

$$e_t \Rightarrow \begin{bmatrix} Lt \\ Ls \\ Lr \end{bmatrix}, \text{ moreover } e_t \in [0;1]. \tag{2}$$

The "instrumental level" of the conceptual model of the mono-template is formed of project, program and portfolio management tools used with the infrastructure project mono-template: models, methods, mechanisms, system analysis, expert evaluation, modeling tools, etc. It is a platform that combines levels L_1 and L_3. Formally, we can write this by expression (3).

$$L_2 = [Li_1; Li_n; Li_{n+1}], \tag{3}$$

where L_2 – "instrumental level" of the conceptual model of the infrastructure project mono-template; Li_1 – tools for infrastructure project management when using a mono-template, depending on the type, level, scale of the project.

The "structural level" of the conceptual model of the mono-template consists of the formed blocks of structural decomposition of the infrastructure project I_n elements of the external and internal environment of the project, stakeholders and safety parameters (4).

$$L_3 \Rightarrow I_n = \langle Le; Lh; Lf \rangle, \tag{4}$$

where L_3 – "structural level" of the conceptual model of the infrastructure project mono-template; Le – infrastructure project environment; Lh – stakeholders of the infrastructure project; Lf – safety parameters that ensure the success of the project and its further safe operation.

The "structural level" L_3 is the upper level and the operational center in the structure of the conceptual model of the mono-template, where the practical application of management parameters and elements of levels L_1 and L_2 is carried out.

5. 2. Development of a schematic model for the process of applying filter systems of elements and parameters of infrastructure project management in safety-oriented project management

Elements and parameters of infrastructure project management when using mono-templates are used throughout the project life cycle. However, their greatest impact is carried out at the stage of project planning, during the structural decomposition of the project with the formation of the necessary project parameters. At this stage, it is extremely important to ensure the formation of only the project set of parameters and the use of a certain set of management elements. Therefore, there is a problem of forming a "certain new" mechanism of the "filter system for project management elements and parameters".

Thus, on the basis of the project-oriented approach and system analysis, a schematic model of the filter system of the infrastructure project management elements in safety-oriented management is formed (Fig. 2). This schematic model schematically visualizes the structure of the infrastructure project filter, which is used to select the necessary management elements and parameters.

The filter system of elements and parameters of infrastructure project management is a system of the uninterrupted process of providing the infrastructure project with segregated management parameters and elements when using mono-templates of projects and safety-oriented management. These filters can have different structures and components, but the basic structure of infrastructure projects is a three-layer DSR platform with filter shells.

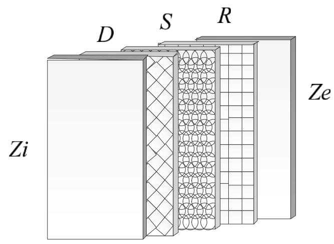

Fig. 2. Schematic model of the filter system of elements and parameters of infrastructure project management in safety-oriented management

The first layer of the filter system is layer *D*, where segregation of elements and parameters of infrastructure project structural decomposition management is performed, which can be described by expression (5).

$$\left[Kcd_1;Kcd_n;Kcd_{n+1}\right]\to D\to\left[Kcd'_1;Kcd'_n;Kcd'_{n+1}\right],$$

moreover

$$n\in\left[0;\infty\right], \qquad (5)$$

where Kcd_1; Kcd_n; Kcd_{n+1} – elements and parameters of structural decomposition management of the infrastructure project; Kcd'_1; Kcd'_n; Kcd'_{n+1} – elements and parameters of structural decomposition management of the infrastructure project that have passed the filter system.

The second layer of the filter system is layer *S*, where segregation of elements and parameters of infrastructure project safety management is performed, which can be described by expression (6).

$$\left[Kcs_1;Kcs_n;Kcs_{n+1}\right]\to S\to$$
$$\to\left[Kcs'_1;Kcs'_n;Kcs'_{n+1}\right],$$

moreover

$$n\in\left[0;\infty\right], \qquad (6)$$

where Kcs_1; Kcs_n; Kcs_{n+1} – elements and parameters of infrastructure project safety management; Kcs'_1; Kcs'_n; Kcs'_{n+1} – elements and parameters of infrastructure project safety management that have passed the filter system.

The third layer of the filter system is the layer *R*, where segregation of elements of infrastructure project resource management is performed, which can be described by expression (7).

$$\left[Kcr_1;Kcr_n;Kcr_{n+1}\right]\to R\to$$
$$\to\left[Kcr'_1;Kcr'_n;Kcr'_{n+1}\right],$$

moreover

$$n\in\left[0;\infty\right], \qquad (7)$$

where Kcr_1; Kcr_n; Kcr_{n+1} – elements and parameters of infrastructure project resource management; Kcr'_1; Kcr'_n; Kcr'_{n+1} – elements and parameters of infrastructure project resource management that have passed the filter system.

All three layers of the filter system of elements and parameters of infrastructure project management segregate management elements and parameters by the interaction of layers, their structure and influence of the filter system shells (external *Zi* and internal *Ze* environment of the project) described by dependence (8).

$$Zi\to\left[D;S;R\right]\to Ze. \qquad (8)$$

The operation parameters of the project filter system layers are variable and are formed depending on the specifics, type, scale of the infrastructure project. Depending on this, they can have different quantitative and qualitative values. The number of layers of the filter system and the total number of such systems are determined at the project planning level. However, it should be borne in mind that increasing the number of filter systems or layers in project planning increases the main project parameters defined by international standards for project, program and portfolio management (time, cost, quality and our proposed project safety parameter), Fig. 3, *a–d*.

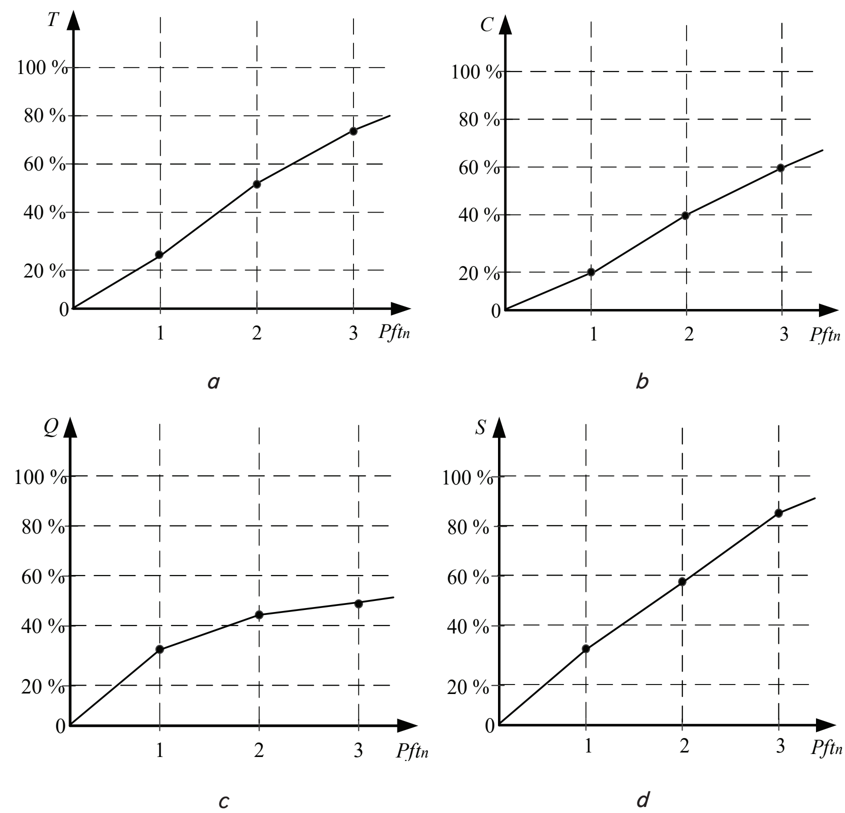

Fig. 3. Graph of dependence of quantitative and qualitative parameters of change: *a* – time of infrastructure project implementation on the use of project filter systems; *b* – cost of infrastructure project implementation on the use of project filter systems; *c* – quality of infrastructure project implementation on the use of project filter systems; *d* – safety parameters of infrastructure project implementation on the use of project filter systems; *T* – time of infrastructure project implementation; *C* – cost of infrastructure project implementation; *Q* – quality of the infrastructure project product; *S* – safety parameters of the infrastructure project; Pft_n – quantitative parameters of the project filter system

Having analyzed the graphs of dependencies, the following should be noted. With the increase in the number or layers of project filter systems, the time (Fig. 3, *a*) and cost (Fig. 3, *b*) of project implementation increase by 25 % and 20 %, respectively, at each stage, which is a negative factor in planning infrastructure projects. However, it should be noted that such an increase leads to an improvement in project quality (Fig. 3, *c*) by 30 % at stage 1, followed by an increase to about 50–52 % at stage 3, as well as project safety (Fig. 3, *d*) by an average of 30 % at each stage. Therefore, the application of such an approach is appropriate and justified.

5. 3. Formalization of the process of segregation of infrastructure project management elements and parameters at the level of a mono-template in safety-oriented management

It should be noted that the segregation of infrastructure project management elements by applying a filter system using mono-templates and safety-oriented management is a complex organizational and technical process. Accordingly, we have formed a formalized model of segregation of infrastructure project management elements at the level of a mono-template in safety-oriented management (Fig. 4).

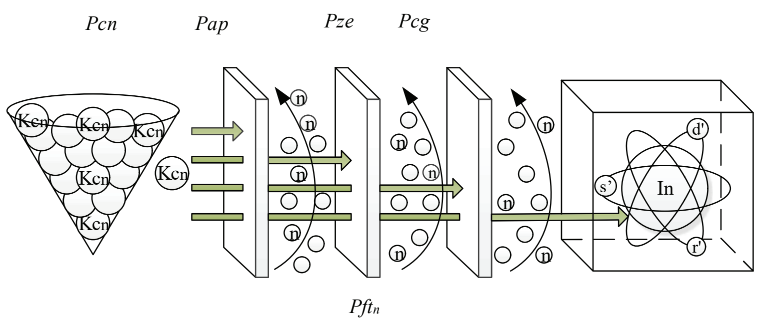

Fig. 4. Formalized model of segregation of infrastructure project management elements and parameters at the level of a mono-template in safety-oriented management

The model formally visualizes the process of selecting infrastructure project management elements and parameters using a mono-template. The model can be used in conducting an expert evaluation to make management decisions or when creating software to optimize the process of planning and implementation of infrastructure projects.

The formalized model is a three-block structure that reflects the process of segregation of infrastructure project management elements, starting from the stage of initiation and planning of an infrastructure project based on a mono-template. The process is carried out through a filter system, where the project is influenced by factors of proactive management, internal project environment, project changes and project system resistance. The process ends with the formation of a safety-oriented infrastructure project with a set of segregated parameters and elements.

The first block of the model is the basis of structurally decomposed elements and parameters of the infrastructure project mono-template. The quantity and value depend on the specifics of the infrastructure project, in particular, scale, size and content. We describe block I by relationship (9).

$$\sum Pcn = \left[Kcn_1; Kcn_n; Kcn_{n+1}\right],$$

moreover

$$n \in [0;\infty], \tag{9}$$

where *Pcn* – structurally decomposed elements and parameters of infrastructure project mono-template management; *Kcn* – elements and parameters of infrastructure project management.

The second block of the model is characterized by the transition of structurally decomposed elements and parameters of infrastructure project mono-template management from the database to the project filter system. In this block, they are segregated in accordance with the needs and specifics of the project, which directly affects the number of filter systems and their layers.

At this stage, the elements and parameters of infrastructure project mono-template management pass through the active phase of the internal project environment. This process includes the impact of proactive infrastructure project management, consideration and response to project changes, its turbulent environment, and so on.

This stage can be described by expression (10).

$$Pcn = \langle Pftn \rangle \in \{Pap; Pze; Pcg\}, \tag{10}$$

where *Pap* – proactive infrastructure project management; *Pcg* – impact of project changes.

However, it should be borne in mind that in the process of passing the elements and parameters of infrastructure project mono-template management through the filter system, they face resistance. The resistance of the filter system is characterized primarily by time delays in the passage of the filter system. It is a process of perception, segregation by the system of qualitatively selected elements and parameters of the mono-template and elimination of unnecessary ones. In the complex, it depends on the number and size of filters, which in turn depends on the scale of the project, the structural layer, the number of management parameters and elements that must be segregated.

The resistance of the filter system can be described by expression (11).

$$Rpft = qft\frac{Nft}{Vft}, \tag{11}$$

where *Rpft* – resistance of the filter system of elements and parameters of infrastructure project mono-template management; *qft* – resistance of the structural layer of the filter system of elements and parameters of infrastructure project mono-template management; *Nft* – number of structural layers of the filter system of elements and parameters of infrastructure project mono-template management; *Vft* – value of the structural layer of the filter system of elements and parameters of infrastructure project mono-template management.

The third block of the model is the formation of structural decomposition blocks of the infrastructure project *In* on the basis of segregated elements and parameters of mono-template management in safety-oriented management. The block can be written by expression (12).

$$In = \{r'; d'; s'\}, \tag{12}$$

where *r'*; *d'*; *s'* – segregated elements and parameters of structural decomposition, resource provision and safety management of the infrastructure project mono-template.

6. Discussion of the results of studying the process of segregation of infrastructure project management elements using a mono-template in safety-oriented management

The development of segregation models of infrastructure project management elements under the influence of changes and safety-oriented management is a comprehensive study. The study involves the process of detailing elements of infrastructure projects, their distribution and behavior under the influence of changes and safety-oriented management. The results of the study were obtained by applying the fundamental principles and provisions of project management, modeling tools and systems analysis. In particular, a three-level conceptual schematic model of the infrastructure project mono-template, which combines instrumental, fundamental and compositional levels (Fig. 1) was formed and formalized (1)–(4). A feature of this model is the process of combining and interaction of three elements in the infrastructure projects mono-templates at the compositional level – the environment, stakeholders and safety requirements for structural decomposition. The limitations of the concept are the dependence of the impact of unpredictable elements of the turbulent environment inherent in infrastructure projects. The three-layer DSR schematic model of the filter system of elements and parameters of infrastructure project management in safety-oriented management is proposed (Fig. 2). Peculiarities of its application in dependences (5)–(8) are described. In comparison with others, this system involves the use of 3 filter layers, each of which is responsible for selecting the necessary elements and parameters for infrastructure projects – decomposition, safety, resources. The disadvantage of the system is that an increase in the number of filter systems or layers when planning a project increases the main project parameters – time, cost, quality, safety (Fig. 3, *a–d*). The model for segregation of elements and parameters of infrastructure project management at the level of a mono-template in safety-oriented management is formalized (Fig. 4) and its dependences (9)–(12) are described. A feature of the model is the integration of the infrastructure project filter system, taking into account the resistance of the system in the process of selecting elements and parameters of infrastructure project management. The result of the model is the formation of a safety-oriented infrastructure project with a set of segregated parameters and elements. The development of this study lies in the development of new and improvement of existing tools for managing changes and content of infrastructure projects at the planning stage.

7. Conclusions

1. The conceptual schematic model of the infrastructure project mono-template is developed. The model of the infrastructure project mono-template is formed of three "fundamental", "instrumental" and "compositional" levels. Applying the tools and fundamental provisions of project management, the compositional level is highlighted. Its feature is the interaction of elements at the compositional level – the environment of infrastructure projects, stakeholders and safety requirements for structural decomposition.

2. The schematic model of the filter system of elements and parameters of infrastructure project management in safety-oriented management is formed. The three-layer DSR (decomposition, safety, resources) system of the project filter, which carries out the selection of qualitative parameters of the infrastructure project mono-template, is proposed. The use of an infrastructure project filter system increases its quality and safety, but increases project costs and implementation time.

3. The model for segregation of elements and parameters of infrastructure project management at the level of a mono-template in safety-oriented management is formalized. The three-block model describes the process of integration and operation of the infrastructure project filter system. The necessity of taking into account the resistance of the system in the process of selecting elements and parameters of infrastructure project management is described. The result of the model is the formation of a safety-oriented infrastructure project with a set of segregated management parameters and elements.

Acknowledgments

Gratitudes to the Ukrainian Project Management Association (UPMA) and management board of Lviv State University of Life Safety.

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