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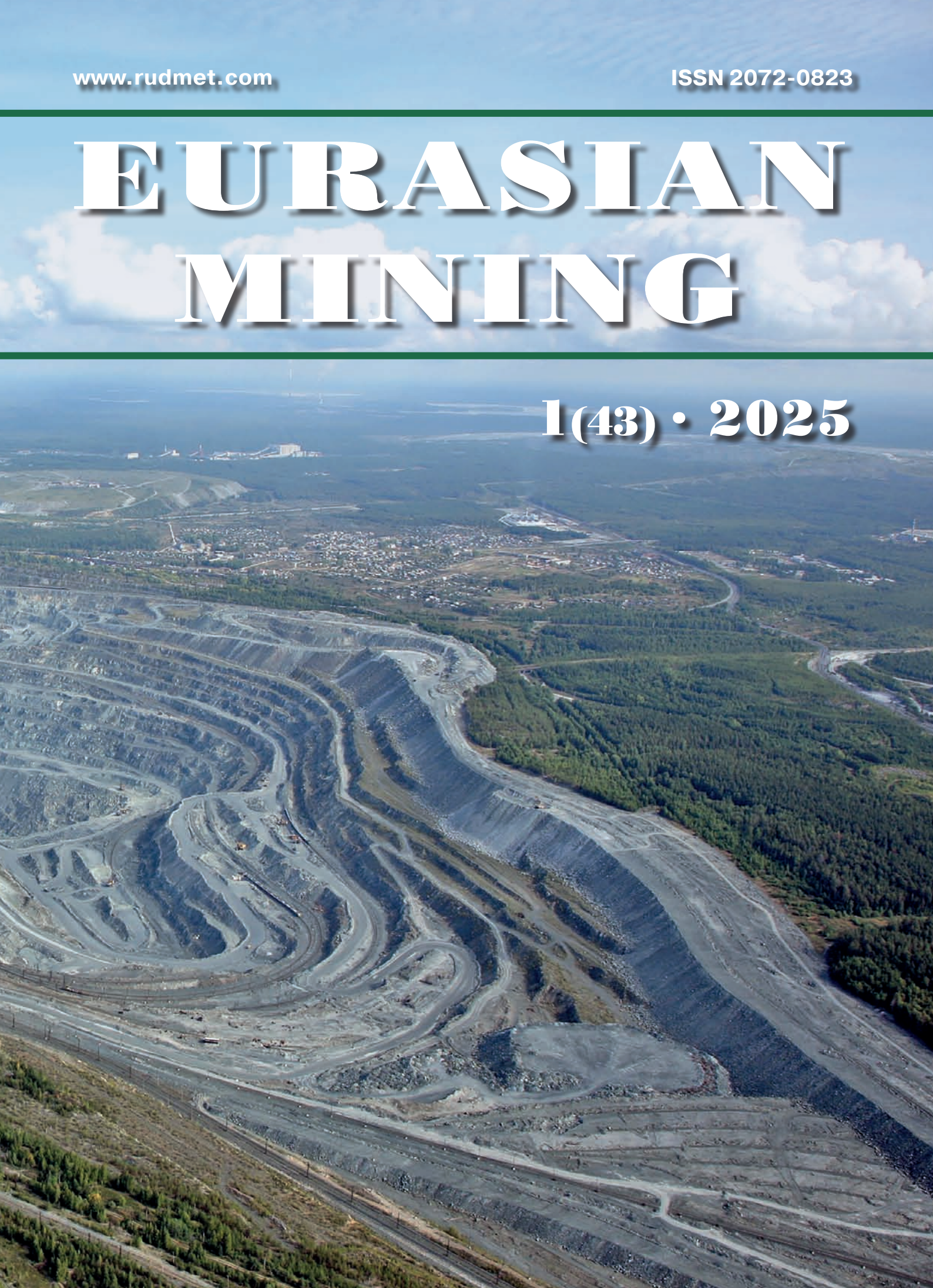

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UDC 334.7

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SPECIFICS OF PROJECT MANAGEMENT IN OIL AND GAS COMPANIES

The project approach is integrated into all sectors of the modern economy. Using new management technologies, companies develop and implement projects that allow them to develop and transform their own business processes. A project should be understood as a professional activity that represents a set of documentation that ensures implementation of a number of activities for the formation or creation of new products, works and services, subject to restrictions on the time budget and performance standards. Each project is project- or product-oriented. This shows up from the perspective of the management process, emphasizing the importance of the team and the distribution of responsibilities during its implementation. Moreover, each project is accompanied by resource potential, which includes: materials, time, people and finances. Managing these elements is the essence of project management, since it makes it possible to distribute them and form implementation stages. Oil and gas companies are also actively implementing project methodologies, using solutions that improve management processes and increase implementation effectiveness. The specificity of project management in the oil and gas sector lies in the complexity of the technological process and management within industry companies. In addition, oil and gas companies are characterized by extensive structures involved in the development, production and refining of oil, which places higher demands on the use of the project approach. The article is aimed at studying the main aspects related to the project activities of modern oil and gas companies, determining their effectiveness and feasibility of application. The purpose of the article is to develop measures to improve the quality of project management in oil and gas companies.

Keywords: *oil and gas industry, project management, methodologies, project scoring, software*
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Introduction

The recent trend in the industry is project management which is integrated in all spheres of economy, including the oil and gas sector. Oil and gas business features a complex production process, long technological cycle and multidivisional architecture of inherent structure and attended facilities [1]. Therefore, oil and gas companies need a special management methodology embracing all stages of monitoring and control of operations, as well as systematization of decisions and structuring of operation stages in the complex and varying market environment. In this regard, it seems to be of interest at this time to analyze the active project methodology in use in the oil and gas sector. Project management also involves program support of various efficiency and complexity. It is interesting to review the actual methodologies of problem recognition and their shortages, and also to find an optimal project methodology which makes it possible to minimize project implementation terms.

Methodology

This interdisciplinary article rests upon integration of methodologies of industrial, technical-and-economical and statistical analyses. The main methods of research are: the content analysis, dynamic and structural analysis, mathematical statistics analysis and research synthesis.

Results and discussion

The present-day project management in oil and gas companies uses novel managerial procedures built upon information solutions. Professional people are attracted to this effect, which are interested in acceleration of business processes at reduced financial loss and material damage. Project management in the oil and gas sector features distinctness and complexity. Project engineering algorithm depends on the goal and type of a project. These issues are addressed by the modern science in Russia. The prominent projects are concerned with ecology and economy, hydrocarbon production and projects elaborated for different geography of implementation.

For example, I. M. Potravny and N. N. Yashalova developed a procedure for the ecological and economic evaluation of projects on burial of greenhouse gas emissions in underground geological space [1]. The scientists proved ecological and economic expediency of climate projects on the ground of their own project management procedure.

In his other study, I. M. Potravny et al. proved applicability of the factor analysis in the oil and gas projects in the arctic regions with regard to risks [2]. In view of the regional complexity and risks of oil and gas project implementation in the Arctic, the authors propose to use an integral index combining an economic efficiency criterion (investment profitability) and a criterion of project implementation on schedule. In addition, it is suggested to take into account five factors of risk: political, social, economic, geological and ecoclimatic risks.

The risks of project management in challenging climate conditions are addressed by V. S. Vasiltsov, N. N. Yashalova and A. V. Novikov [3]. The authors propose to attend project management with the PEST analysis to determine the set of specific factors of the external impact on the projects connected with formation of an infrastructure in the arctic coastal areas.

For the successful implementation of carbon projects, I. Yu. Novoselova et al. [4] put forward a risk-function mechanism regarding every mineral deposit under analysis.

For another thing, there is a system approach to management of specific oil projects implementable in any area, including carbons. The stages involved in such project implementation are explained in **Fig. 1** [5].

New products in the sphere of low-carbon technologies in Russia are developed by scientific research institutes and specialized agencies facilitating promotion. In Russia innovative establishments at large corporations analyze the preferred directions for low-carbon technologies [6, 7].

Then, the potential market and commercialization potential of a product are analyzed. To this effect, a range of applied experiments is carried out, which prove efficiency of projects and their real effect on the atmosphere. On the basis of the investigations, the economic efficiency of decision-making and the commercialization potential are determined for different scenarios of project implementation [4].

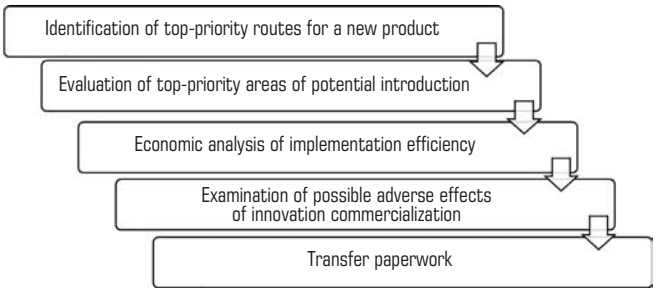

Fig. 1. Stages of project management in low-carbon technologies

The project risks as well as the degree and potential of implementation of innovations are revealed [8].

Furthermore, potential buyers, businesses and spheres of potential implementation of new technologies are identified.

Then, the adverse effects of commercialization of new technologies are analyzed, and the technology-, innovation- and patent-related risks of project implementation are revealed. For the revealed risks, available scenarios of their neutralization are worked out, an integrated commercial offer is prepared for potential partners and the technology transfer is launched [8].

After that, the scoring or efficiency evaluation of oil and gas projects is carried out. The analyzed indicators of efficiency of a project are [9]:

— the proceeds and conformity with the needs of an oil and gas company;

— the labor content and scale of the project implementation.

According to another methodology applied by large oil and gas corporations, project management has 8 stages (**Fig. 2**).

The stage of conceptual designing shapes a clear idea and understanding of a project. Furthermore, the goals, objectives, potential and effects of the project are generated. Here, it is important to use the system and project approaches which originally improve comprehension and decision-making [10].

The stage of preliminary engineering design involves estimation of a project scale, creation of the project implementation process, interaction between its components, as well as reduction of risks and errors. The aim of this stage is control and implementation of a project at the earliest possible date [11].

The subsequent stages are the purchase of equipment and assets; building and construction works; onshore start-up and commissioning. Each stage involves responsibility loading of project team members, project implementation period and budget. Many corporations employ a Project Manager introduced in North America for the decision-making improvisation with quality improvement and perfection of project results [6, 9, 12].

This approach is actively used under uncertainties, and implementation of the main project stages includes decision-making on the basis of input data; thus, it determines transition to the final stage and, then, completion of a project.

Attention is concentrated on creation of added value, multi-functional integration and application of progressive procedures and advanced equipment [13].

Finally, introduction of a specific object, for which the project is implemented, into service is analyzed [14, 15].

Implementation of projects can use various information systems suitable for situations of various complexity and scale. An example is the mega-project time management through the EPC Contracts (Engineering, Procurement, Construction) [16, 17]. This system unites designers and executers within the same platform, and plans each type of activity and control, and in-between collisions. Furthermore, the system allows analyzing key indicators — 'signal lights', and portfolio of projects and programs which help implement successfully mega-projects in the oil and gas sector.

A company in this system is a space, and a project portfolio is a group. There are graphic charts per individual components and stages of projects, as a result of which a turn-key solution is formed. This information system can determine completion date of a project at any stage of implementation, the cost of types of works, and also can compare the target and pro forma costs [18]. On the other hand, the use of this software involves some difficulties (**Fig. 3**).

These problems are solvable to a certain degree using software Plan-R — a high-tech system for scheduling and network planning. This software is introduced at such large oil and gas companies as Transneft, Tatneft etc. [19]. This solution is mostly used in oil and gas building and construction. This software provides 100% connection of all contractors within a single time-table, collisions and delays are reduced by 27%, and much less work is included in the graphical charts. The software ensures fast

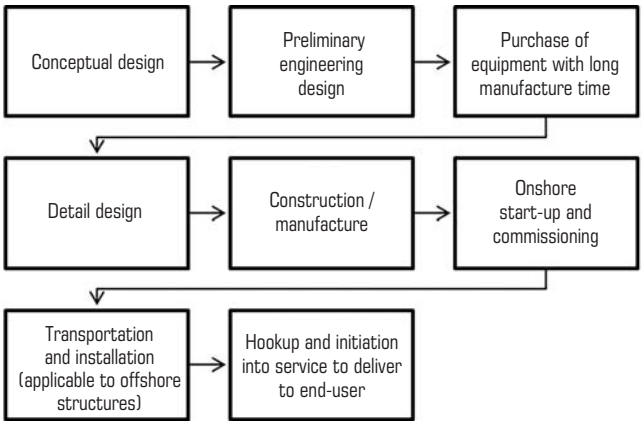

Fig. 2. Stages of project management

completion of all functions. Project management supports all paperwork and nodal construction technology for oil and gas facilities.

Moreover, the software displays analytics of key indicators and signal lights, and ensures multi-user integration with the other systems. This platform provides high efficiency and high quality in shaping scopes and schedules of design works using a hierarchical structure of project cost.

The methodology allows drawing a conclusion on project management efficiency using quality software. At the same time, the analysis of the efficiency and effectiveness of some projects implemented recently by ROSNEFT Corporation points at some losses related with risks.

The available project estimates incompletely assess risk of every business project because of the lack of the necessary tools and methodology. For this reason, it is advisable to develop novel project management tools for oil and gas companies to prevent losses due to unsound management, to reduce risks of project implementation and to improve project management in a company as a whole.

It is also necessary to develop technologies and perform monitoring without attracting foreign platforms which are no more interesting for the Russian companies because of the sanctions.

New models are to be tuned up and adjusted to fit the operating doctrine and digital environment of a corporation.

It is expedient to arrange business processes in the field of the corporate project management such that their automation conforms with the requirements of controllability, maintainability and evolvability. Controllability is governed by centralization of each process in a project and by the need of control over them at the end of the process owners.

Maintainability means that software programs have vendors supervision which is a 'policy of insurance' for an IT manager [20].

Evolvability assumes a neat and intelligent system of development, ideally, a strategy and plans.

Only Russian designers are appropriate for problem-solving within a Russian company, and it is much faster to shape and tune up a system with the help of the Russian designers than to find and replace conventional vendors.

In this case, a company gets additional financial gains in the form of reduction of losses of inefficient projects and new benefits thanks to diversification of project management toward carbon technologies. For instance, ROSNEFT implemented many low-carbon projects without reaching a planned effect. This lays emphasis on the need to advance low-carbon generation. Such projects are promising and can promote progression in low-carbon energy generation according to estimates of the top management at ROSNEFT [21].

Figure 4 shows some indicators to prove expediency of introduction of low-carbon generation. As seen, reduction of gas dispersion in gas lift in 2023 reached 66.5 Kt. Financially, this means cut-down of expenses connected with ecology and methane removal from air. Given that such

On-line inspection is complicated	The schedule charts and activity nets comprehensively cover only construction and commissioning works, with generalized collateral operations
Work period is unknown	It is impossible to calculate a true work duration since there is no procedure of aggregation of input data and resources
Activity nets differ from each other	No rules of determining sequence of works
Critical path method is inapplicable	Integrity of network model is often broken
Correction sequencing of works is impossible	Insufficient particularization of graphic charts
It is impossible to predict work completion term	No procedure for calculating task completion date by the actual intensity of works is applied
Inaccurate timing	When realizing a graphic chart, a supervisor subjectively defines estimated terms of accomplishment and completeness of works on the basis of visual assessment
No solutions for executives	The schedule charts and activity nets are only accessible to a small team of professional designers

Fig. 3. Difficulties in the EPC Contracts

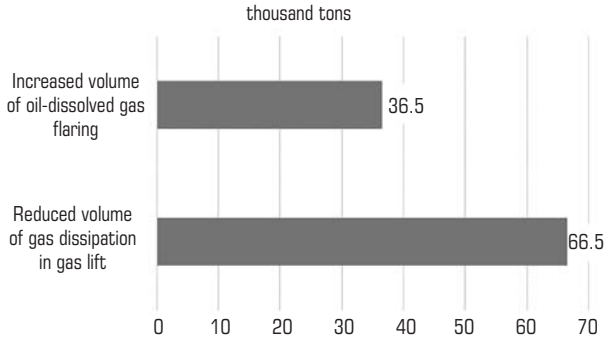

Fig. 4. Methane emission after carbon management introduction at ROSNEFT in 2023, Kt (ROSNEFT–2023 Strategy)

expenses are not less than 3 million rubles per 1000 t of gas dispersion in air (according to the ROSNEFT's Sustainable Development Report), an approximate effect is 199 500 million rubles.

In this manner, the Company saves almost 200 billion rubles thanks to re-orientation of projects. This fact proves the necessity of new project methodologies and information systems to build an efficient management architecture.

Conclusions

The implemented research allows drawing a conclusion that project management in the oil and gas sector should use quality software systems. It is required to select software support to suit the scope, scale and number of projects and project participants. It should be highlighted that adjustability and evolvability of projects is the most important criterion for the selection of a software system.

All program solutions should be adjusted and supported for the best precise determination of processes and check points in operation of the program products.

It is important to apply new mechanisms of the modern digital environment, namely, artificial intelligence and its capabilities, which can improve controllability of projects, and developability of each process and traceability of all stages and executives.

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