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NEW ISSUES OF THE QUALITY MANAGEMENT AND ITS CERTIFICATION

**V.V. Glukhov¹, A.A. Yakovlev¹,
M.G. Livintsova¹, E.A. Kucheryavy²**

¹ Peter the Great St. Petersburg Polytechnic University,
St. Petersburg, Russian Federation;

² Tampere University,
Tampere, Finland

In the paper, on the example of features of Transneft Druzhba, JSC the issues of sufficiency of certification of an organisation's quality management system for compliance with the requirements of "ISO 9001: for the provision of services" were considered. It is shown that the organisation's quality management system certificated for compliance with ISO 9001 requirements does not guarantee consumers the quality of goods (or services) declared by the organisation, and the adopted system of certification of the quality management system undermines trust in the international quality certification institute. The purpose of the study was to prove that, to control the quality of the subject's work, an adequate understanding of its structure, kinematics and additional features that allow organisation to extract unrecorded financial benefits is required. With outside control, controllers usually pay attention only to the subject of the verification itself, overlooking the fact that it belongs to a larger system that encompasses it, and its participation in a single process of forming the final product. Therefore, when verifying the implementation of ISO 9000 standards, they are usually shown only those areas of the organisation that can pass the quality inspection and do not disclose the existing links between sequential processes. Thereby they exclude the existing transaction costs from consideration (in particular, the costs associated with the need to implement input control at least based on the use of statistical methods). To confirm the initial hypothesis, the paper used methods of scientific abstraction and functional analysis. As a result of the research, the following statements are confirmed. Quality management and knowledge management issues have the complementary nature. The object is independent of knowledge and existed before its appearance. On the contrary, the subject of knowledge forms knowledge itself. "Including" an object in its activity, the subject considers it from the sides he is interested in, which become the "representative" of the entire multilateral facility, forgetting that the object of knowledge is a product of his cognitive activity, subjected to specific laws that do not coincide with the laws of the object itself. It is further proposed to present a model of certification of the quality management system, in which the existing shortcomings will be eliminated.

Keywords: quality, quality management, quality management certification, ISO 9001, knowledge of the subject of study, knowledge management, falsification

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НОВЫЕ АСПЕКТЫ МЕНЕДЖМЕНТА КАЧЕСТВА И ЕГО СЕРТИФИКАЦИИ

**Глухов В.В.¹, Яковлев А.А.¹,
Ливинцова М.Г.¹, Кучерявый Е.А.²**

¹ Санкт-Петербургский политехнический университет Петра Великого,
Санкт-Петербург, Российская Федерация

² Университет Тампере,
Тампере, Финляндия

В работе на примере особенностей деятельности АО «Транснефть – Дружба» рассмотрены вопросы достаточности сертификации системы менеджмента качества организации на соответствие требованиям стандарта ISO 9001: на оказание услуг. Показано, что наличие у организации системы менеджмента качества, сертифицированной по стандарту ISO 9001, не гарантирует потребителям заявленного организацией качества товаров, а принятая система сертификации системы менеджмента качества подрывает доверие к международному институту сертификации качества. Цель исследования: доказать, что, контролируя качество работы предмета, нужно иметь адекватное представление о его структуре, кинематике и дополнительных возможностях, позволяющих извлекать неучтенную финансовую выгоду. При стороннем контроле контролеры обычно обращают внимание лишь на сам предмет проверки, упуская из рассмотрения факт его включенности (принадлежности) более крупной, объемлющей ее системы, его участия в едином процессе формирования конечного продукта. Поэтому при проверке внедрения стандартов ISO 9000, им, как правило, показывают лишь области организации, способные пройти проверку и не раскрывают существующие связи между последовательными процессами, исключая, тем самым, из рассмотрения существующие транзакционные издержки (в частности издержки, связанные с необходимостью осуществления входного контроля, хотя бы на основе применения статистических методов). Для подтверждения исходной гипотезы в работе использованы метод научной абстракции и функциональный анализ. В результате научного исследования подтверждены следующие утверждения. Вопросы управления качеством и управления знаниями имеют взаимодополняющий характер. Объект независим от знания и существовал до его появления. Напротив, предмет знания формирует само знание. «Включая» объект в свою деятельность, субъект рассматривает его с интересующих его сторон, которые становятся «представителем» всего многостороннего объекта, забывая, что предмет знания – продукт познавательной деятельности субъекта, подчиненный специфическим закономерностям, не совпадающим с закономерностями самого объекта. В дальнейшем предлагается представить модель сертификации системы менеджмента качества, в которой будут устранены существующие недостатки.

Ключевые слова: качество, управление качеством, сертификация управления качеством, ISO 9001, знание предмета исследования, управление знаниями, фальсификация

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Introduction

Over the past 30 years, the quality management system (QMS) based on the requirements of the international standard ISO 9000 series has become most desirable for implementation and worldwide recognized unified system of intercompany management.

The theoretical origins of the quality management system embodied in the ISO 9000 series lie in the concepts of the founders of the theory of Total Quality Management (TQM): W. Deming, W. Shuhart, A. Feigenbaum and J. Juran. The contribution of Russian scientists to the theory and practice of quality management is reflected in the works of Yu.P. Adler, G.G. Azgaldov, V.G. Versan, V.A. Lapidus, V.V. Okrepilov and others.

Standard ISO 9001 can be used by any organisation, large or small, regardless of its field of activity. This standard is based on a number of quality management principles including a strong customer focus, the process approach, the motivation and implication of top management. The implementation of the



QMS directs the enterprise to the continuous improvement of all internal processes and this allows them to achieve positive production and economic results.

In turn, the QMS certification process involves:

- determination of the degree of compliance of the QMS of the audited organisation with the requirements of ISO 9001-2015;
- assessment of the effectiveness of the QMS.

The ISO 9001 standard does not require mandatory certification, but companies, as a rule, carry it out. Motivating factors can vary. Some organisations use the QMS certificate to demonstrate their achievements to external interested parties. Others genuinely try to look at their business processes from the outside and improve them, build their work correctly and thus increase their own efficiency. And if we are talking about the conclusion of contracts by Russian enterprises with foreign partners and their export activities, certified QMS is a mandatory requirement of consumers.

Identification of both internal and external factors is important for the development of recommendations to stimulate the QMS implementation and certification activities of Russian enterprises that manufacture products and provide services.

Every year, the number of certificates for QMS compliance with ISO 9000 standards increases all over the world. According to the latest ISO report (published in September, 2020), the number of recognized certificates of compliance with ISO 9001 requirements in Russia was 4,134 out of 883,521 worldwide by the end of 2019. The report also provides data on the number of certified production sites. For Russia, this indicator was about 6,000 out of 1,217,972 worldwide.

In the study [1] the future certificate numbers of several countries were estimated, and it was predicted that there would be an increase in the number of certificates of all researched countries except Australia and the Russian Federation. According to 2026 data, it is estimated that a decrease of about 62.7 % in the number of certificates is envisaged for the Russian Federation.

A number of studies analyse the economic effect of the QMS certification for compliance with ISO 9000 requirements. For example, in [2], such an analysis is carried out for Russian manufacturing companies.

But despite the obvious advantages of the QMS, issues of practical feasibility and economic efficiency of its implementation, as well as the sufficiency and quality of certification, have great importance.

Purpose

The purpose of this study was to prove that, to control the quality of the subject's work, an adequate understanding of its structure, kinematics and additional features that allow organisation to extract unrecorded financial benefits is required.

Achievement of this purpose provides for the solution of the following tasks:

- to assess sufficiency of the organisation's quality management system certification for compliance with the requirements of ISO 9001;
- to determine the methodology of the object's certification taking into account its system characteristics.

The object of the research is Transneft Druzhba, JSC.

The subject of the research is the certification of the Transneft Druzhba, JSC quality management system.

Methods

The problem of the practical significance of the QMS, as well as its certification, is a topic of constant discussion in recent years both in the territory of the Russian Federation and abroad [3–5]. At present, it has two camps. On one hand, its supporters, the system theorists, vehemently prove its usefulness and importance for everyday practice, on the other hand, there are specialist-practitioners directly working in the

field of production and promotion of goods and services. They, of course, are supporters of the high quality of goods and services. But they believe that this problem should be solved in a different way.

It should be noted that such stars of the QMS as J. Juran, who called “losses due to the poor quality of the “golden dwelling” of the American economy”, joined the ranks of the latter [6, 7]. J. Seldon in his book “In Search of Quality. The case against ISO 9000” directly expresses its opinion about the existence of more reliable ways to increase the efficiency of enterprises, ensure real quality and increase profits than work on the basis of the prescriptions of the standards of ISO 9000 [8, 9]. In his opinion, “the introduction of the standards of ISO 9000 caused damage competitiveness of hundreds of thousands of organisations”. He made the reference to the opinion of British experts, closely connected with the introduction of the British standard BS 5750, that the basis of the international standards ISO 9000 shows that “the introduction of BS 5750 / ISO 9000 in British industry has become the biggest fraud”.

Russian scientists in the field of standardization and quality, in particular V.G. Versan, are not so categorical in their statements. However, they also have great doubts about the feasibility of the modern approach to the QMS. “I believe with increasing confidence that a significant reason for the low efficiency of the quality management system is its structural incompatibility with the enterprise management system. There is no proposed key for integration by standards. Most enterprises cannot cope with this problem independently and, when introduced, the QMS does not become an integral part of the enterprise management system; it remains a foreign body” [10, 11].

The main idea of the QMS is that small investments in the prevention of the low-quality production significantly reduce both losses from defects and the quality assessment costs with the improvement of consumer properties of products and services. Meanwhile standardization has significance as a factor of improving the technological potential of an enterprise [12]. The main problems of effective quality management using the QMS arise from inept application of existing regulations and a formal approach to organisation and management of the QMS [13].

Let us look at the results of the practical implementation of this idea on the example Transneft Druzhba, JSC in April–May of 2019. Methods of scientific abstraction and functional analysis are used in the study.

Results and discussions

Transneft Druzhba, JSC (formerly PJSC “Trunk Oil Pipelines Druzhba”) has been operating since 1964. Oil pipelines pass through Russia, Ukraine, Belarus, Poland, the Czech Republic, Slovakia, Germany, Hungary, Latvia and Lithuania. More than 100 million tons of oil per year, or about 300 thousand tons per day, are transported through the Druzhba trunk pipeline system. To ensure the quality of material and technical resources (MTR) supplied to the organisations’ facilities of Transneft system, in 2015 Transneft, JSC introduced a multi-level quality control system that determines the requirements for the use, manufacture, installation and operation of MTR [14, 15].

Transneft Druzhba, JSC has successfully passed the quality management system certification, which resulted in the issuance of a certificate of compliance with the requirements of the international standard ISO 9001: 2015 (the provision of oil (oil products) transportation services) (see Fig. 1). In January, 2021, Transneft Druzhba, JSC recertificated its quality management system with an expanded scope.

The presence of this document gives reason to believe that Transneft Druzhba, JSC fully complies with the requirements of the international standard in the specified area, and indicates that the company has achieved such a level of reliability and good quality that should provide its consumers’ confidence in compliance with all conditions. The task of the QMS is to create conditions that minimize errors in the work. At the same time, the certificate of conformity itself is an external independent verification of achieving the standard requirements, proof of competent enterprise management and its orientation towards the consumer.



Fig. 1. Certificate ISO 9001: 2015

Source: Transneft Druzhba, JSC¹

That said, these documents confirming the high level of quality assurance did nothing to prevent a situation that caused considerable losses for Transneft, JSC and the Russian Federation budget, as well as substantial reputation damage for both the Russian oil and gas industry, and for the Russian Federation as a whole.

The essence of the matter is as follows. On April 19, 2019, a representative of The Belarusian State Concern for Oil and Chemistry (Belneftekhim) reported that for several days, the Druzhba trunk pipeline system was delivering oil from Russia to Belarus with a twentyfold excess of the maximum permissible values of organochlorine reagents. Thus, the terms of the oil supply contract were violated.

According to the business news portal, Transneft JSC officially recognized this discrepancy, assuring that the problem would be resolved within the next coming days². A few days later, it was reported that the equipment at the JSC Mozyr Oil Refinery in Belarus was out of service due to poor oil quality³. Subsequently, due to the problems with the Urals oil quality, consumers in Germany, Poland and Slovakia refused to accept it through the Druzhba pipeline. On May 21, 2019, it became clear that the resumption of oil exports from Russia to Poland and Germany would not be possible in the near future. According to Reuters⁴, plans for a French company Total (renamed TotalEnergies in 2021) to transfer a larger share of dirty oil from the pipeline to its refinery in Germany for its subsequent dilution and processing have failed: the Total Refinery in Leuna suspended operations due to equipment failure, possibly related to the processing of contaminated oil [13–15].

¹ Transneft Druzhba Passes Certification Audit of Quality Management Systems. URL: <http://en.druzhba.transneft.ru/press/news/?id=878-91&re=en> (accessed 15.06.2021).

² Podobedova L., Malyarenko E., “Rosneft” vozlozhila na “Transneft” raskhody po ushcherbu za “gryaznyuyu” nefi’ [Rosneft made Transneft liable for damage caused by “dirty” oil]. URL: <https://www.rbc.ru/business/27/04/2019/5cc42af59a79473ed185e8f8> (accessed 15.06.2021). (rus)

³ Trunina A., Belorussiya snyala zapret na eksport nefteproduktov iz-za “gryaznoj nefi” [Belarus lifted a ban on the export of petroleum products due to “dirty oil”]. URL: <https://www.rbc.ru/economics/21/05/2019/5ce42ea89a7947be7c31a7c9> (accessed 15.06.2021). (rus)

⁴ Zhdannikov D., Yagova O., Gorodyankin G. Exclusive: Russian pipeline reStart hit by dirty oil evacuation problems. URL: <https://www.reuters.com/article/us-russia-oil-exclusive-idUSKCN1SR1JY> (accessed 15.06.2021).

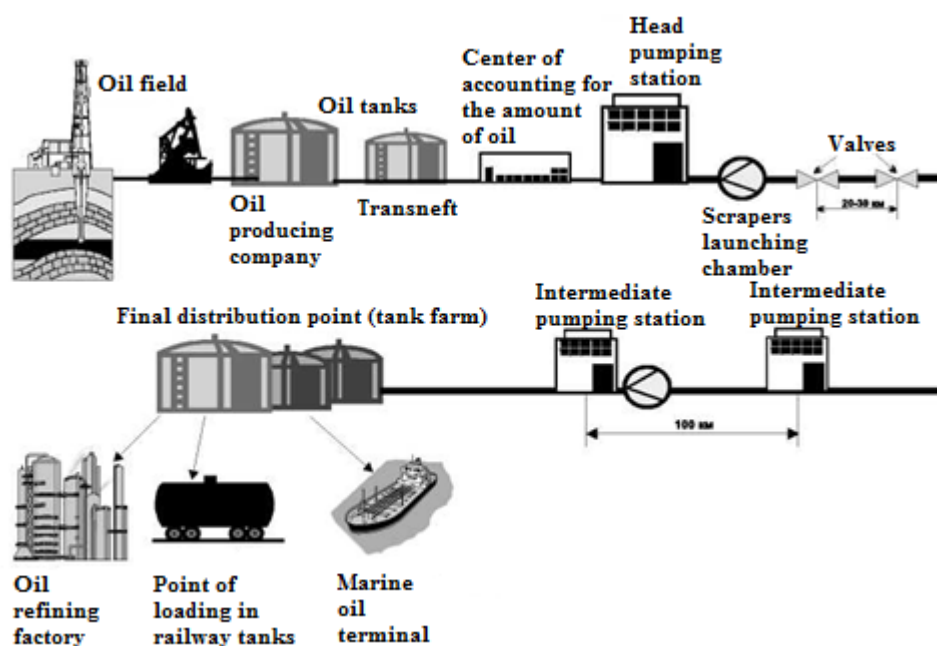


Fig. 2. Scheme of the construction of the main oil trunk pipeline

Source: Subbotin Yu.A.⁵

For a better understanding of the problem, Fig. 2 provides a scheme of facilities for the main oil trunk pipeline.

A deep enough analysis of the situation with the Druzhba pipeline, presented immediately in the article [16], shows the following. The roots of this situation should be sought in the distant 1970s. Then, with the depletion of old Soviet oil fields, their oil output began to fall, as a result, the cost of oil extraction was no longer covered by the commissioning of its new reserves. For their compensation, a technology has been developed to reduce the oil viscosity, facilitating possibilities to extract it to the surface, in accordance with which oil producing companies began to use organochlorine reagents.

Over time, the incompatibility of technologies for reducing viscosity of oil based on organochlorine compounds and for its purification from sulfur compounds emerged. As a result, the hydrochloric acid, an active oxidant of metals causing corrosion, was produced as a by-product in the refineries, which led to accidents at the plants. In addition, the interaction of reaction products was generating a powdery substance, which accumulated in the equipment leading to their failures. Whereby, these processes are already developing at such low concentration of organochlorine as several grams per ton of raw materials. The reasons for what happened were described in details in the publications [17–19]. Authors set out their proposals for elimination of this reasons as well.

As a result of these phenomena, the end of the 1990s was marked by major accidents of technology equipment at many refineries in the country, requiring their stops and unscheduled repairs. In October 2001, the use of organochlorine in oil production was forbidden by order of the Ministry of energy of the Russian Federation no. 294.

Despite this, in January 2002, Gosstandart presented standard GOST R 51858-2002 “Oil. General technical conditions”, which normalises the maximum permissible concentration of organochlorine in oil at the level of 10 grams per ton (10 ppm).

⁵ Subbotin Yu.A. Organizatsionno-proizvodstvennyye struktury transporta [Organizational and operating structures of the transport], Novosibirsk, Siberian State University of Water Transport, 2016. 384 p. (rus)

Considering that these substances are not presented in natural oil, some experts theorized that the standard thereby “stimulated” their use in oil production⁶. What, in fact, oil producers immediately put in use. After that, refineries began experiencing failures and accidents for the reason described above again, which eventually led to the situation we are considering.

N. Tokarev, the head of Transneft, JSC, during his meeting with President of the Russian Federation, reported that the rules of oil acceptance established by the above interstate and national standards, do not define the procedure and responsibility for the measurement of oil characteristics. Therefore, product preparation, oil quality control and its transfer to the oil trunk pipelines system are carried out both by the oil producing companies themselves and the intermediary enterprises. Therefore, there is always a possibility of occasional “discharge” of both contaminated and unrecorded oil into the transport system.

The process of oil compounding is the operation of mixing oil flows distributed over the entire route of its transportation. It is intended to ensure the permissible concentration of a number of harmful impurities. There is no doubt that this should be handled directly by Transneft, JSC in cooperation with companies owning oil metering and discharge units, which are about 150 in the Druzhba system. Transneft, JSC is the main operator here. Oil coming from companies is sent to the buffer storage tanks belonging to it. Dispatchers of the oil company achieve an acceptable concentration of impurities in the mixture by regulating the flow of oil between the points of its reception and delivery to consumers. To do this, they need operational information about the quantitative characteristics of oil in the Russian territory at different points of the main oil pipeline and the coordination of the actions of all participants of this process. Recently, the solution of this problem is complicated by a reduction in the volumes of light and low-sulfur grade oil sent to the export mix.

It can be assumed that, according to the formal criteria, a certified QMS of oil according to its technical capabilities should have excluded any possibility of falsification. As it should be known, to solve such a problem, the following methods are needed:

- a method determining the order of the oil quality assessment;
- a system of metrological support of such a control process;
- a system of training of specialists responsible for the control task;
- a system for preventing the unauthorized receipt of substandard oil into the main pipeline.

In accordance with this, flow and density metres needed to determine the mass or volume of oil entering the pipeline should be installed in the drainpipe of each storage facility. As well as an automatic analyser of the content of the organically bound chlorine in oil (with measurement accuracy of at least 10^{-7}) should be used. Its purpose is to prevent the flow of oil on signal of exceeding the permissible concentration of organochlorine. That, in fact, should have been confirmed in the QMS certification process.

At the same time, the controversy between the industry experts about the reasons of oil contamination observed in social networks and off-line showed that control of the content of organic chlorine compounds, whose presence can be detected only in the laboratory, in forming of export oil mixture actually was not conducted due to the lack of a measuring devices installed directly in the pipeline. Oil was tested only for density, sulphur content, mechanical impurities and other parameters.

It is generally accepted that the main goal of commercial organisations is to maximize their profits. It is achieved by increasing margin, reducing costs of any kind, believing, by default, that the management of the organisation will honestly fulfil its obligations, ensuring the high quality of its products and services and never enter the “slippery path” of fraud and deception of its consumers.

However, life constantly convinces us that it is much easier and cheaper to solve such problems through counterfeiting, falsification, and even outright fraud. Based on this, the author [16] makes an assumption about the economic benefit for Russian oil companies from refining their cheaper, off-grade oil at their refineries, despite the need for more frequent replacement of plant equipment. Therefore, the consequences

⁶ Gelman M. “Diversiyu” na nefteprovode “Druzhba” sprovocirovalo samo Minenergetiki [“Diversion” at Druzhba Pipeline Was Provoked by the Ministry of Energy]. URL: <https://newizv.ru/article/general/11-05-2019/diversiyu-na-nefteprovode-druzhba-sprovocirovalo-samo-minenergetiki> (accessed 20.08.2021) (rus).

of the mass use of organochlorine reagents, providing the oil cost reduction due to the effect of scale, were known and well calculated. In this case, the costs associated with the periodic replacement of equipment at the points of oil refining, while adhering to the permissible amount of application of this technology fit within the permissible limits. All this has been functioning since at least 2002, which indicates significant gaps in the existing company's QMS at the time of its certification.

Summing up the above, it should be noted that the features of the oil production areas described in the article [16] have caused massive use of these mining technologies. As a result, the systemic property of emergence, not taken into account in the process of oil production, manifested itself. The delay in adequate modernization of equipment and failure to introduce monitoring systems not specified in the QMS produced synergistic effect and resulted in damage greatly exceeding any allowable cost limits associated with the replacement of equipment. Russia suffered reputational damage as well. The problem demanded involvement of the government.

At the same time, the top management of oil production structures must take into account the fact that, at present, scientific and technical development is the determining factor of economic stability and development of enterprises, their competitiveness on the world market [20].

Conclusions

1. The first conclusion from the above is as follows. The solution of the main task of any commercial organisation, the problem of earning a profit, is based on the consideration of systemic issues – not process-based ones. The organisation's QMS created under the standard ISO 9000 does not guarantee the quality of goods or services declared by the organisation to consumers. Moreover, the adopted QMS certification system undermines the trust in the international quality certification institute. An auditor who made a positive decision during certification should be responsible for the performance of the system that is under his control.

2. More emphasis needs to be placed on knowledge management. This raises the question, what do we actually certify? Is this the object: a production system in the territory of the Russian Federation and the supply of oil to a foreign consumer? Maybe, the subject of the study is the model of an oil transportation system element within the framework of the territory controlled by Transneft Druzhba, JSC? Or is it a knowledge regarding the indicated model, claiming the existence of a system declaring the creation of conditions that minimize errors in the process of oil transportation?

The object is independent of knowledge and existed before its appearance. While the subject of knowledge forms knowledge itself. "Including" an object in our activity, we consider it from the sides we are interested in, and which become the "representative" of the entire multilateral object. Since this knowledge is about the existing, we objectify it, forming a "subject" and believing it to be adequate to the object. However, we forget that the subject of knowledge is a product of our cognitive activity subjected to specific laws that do not coincide with the laws of the object itself [21, 22].

Therefore, solving the problem of quality management, the noted above gaps, which the Total Quality Management (TQM) never paid attention to, should be filled using recommendations of the Theory of Constraints (TOC) which can be found in works [23–27].

Thus, the whole subject of study should be certified (see the diagram in Fig. 2). It unites the "production + supply + processing" system. Certification of its individual elements excludes the "system effect" from consideration. In fact, this is what the system was created for.

3. The next conclusion follows from the previous one. In order to control the quality of the subject's work, you need to have an adequate understanding of its structure, kinematics and additional features that allow you to extract unrecorded financial benefits. And here again the Theory of Constraints will be useful, because, with external control, auditors or controllers usually pay attention only to what is being tested. Therefore, when verifying the implementation of the ISO 9000 standards, managers show to controllers only those areas of the organisation that are able to pass the test.

Quality control within the state should be handled by the state. In cases supposing international participation, it is necessary to involve a qualified specialist in specific issues at the certification stage.

It is noteworthy that deep immersion in the area of the E. Goldratt's Theory of Constraints leads us to understanding that it represents a development of the provisions of the Tectology by A. Bogdanov [28].

Directions for further research

Further research is related to the study of the possibility of applying the economic system energy-dynamic balance construction theory in the description of the QMS process model. In this case, it is possible to formulate at least two tasks namely, to solve the problem of an adequate understanding of the research object's structure, its kinematics and to assess additional capabilities that allow organisation to extract unaccounted financial benefits.

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СВЕДЕНИЯ ОБ АВТОРАХ / THE AUTHORS

ГЛУХОВ Владимир Викторович

E-mail: office.vicerektor.me@spbstu.ru

GLUKHOV Vladimir V.

E-mail: office.vicerektor.me@spbstu.ru

ЯКОВЛЕВ Андрей Анатольевич

E-mail: yakovlev_aa@spbstu.ru

YAKOVLEV Andrey A.

E-mail: yakovlev_aa@spbstu.ru

ЛИВИНЦОВА Мария Геннадьевна

E-mail: livintsova_mg@spbstu.ru

LIVINTSOVA Maria G.

E-mail: livintsova_mg@spbstu.ru

КУЧЕРЯВЫЙ Евгений Андреевич

E-mail: evgeny.kucheryavy@tuni.fi

KUCHERYAVY Evgeny A.

E-mail: evgeny.kucheryavy@tuni.fi