

UDC 696.1:658.5

Corporate registers of requirements on the path of development of technical regulation in construction

This paper examines the main changes in the normative and technical regulation of the construction industry associated with the beginning of the implementation of the register principle, digital transformation and the gradual transition to parametric standardization. Most of the ongoing changes are aimed at reducing the time and cost of surveys, design and construction, improving the quality of design and construction products. They are becoming everyday professional practice.

The paper pays special attention to the registry principle, which provides for the formation of an integrated system of regulatory documents containing general mandatory requirements applicable to all stages of the life cycle of capital construction projects. Such registries can and should contain a full volume of information and the tools necessary for working with it, which are required by a specialist. In this regard, registries are increasingly called digital technology. The paper briefly analyzes the results of the first year of operation of the digital Register of Requirements to be used in engineering surveys, design, construction and demolition. The prospects for converting this Register of Requirements into machine-readable and machine-understandable formats, lists of tasks to be solved and conditions for further development are considered. A comparison with registry tools used in Russia and foreign countries is made. The issues of updating requirements within the existing and newly created registries are raised. A rationale for the use is proposed and an assessment of the capabilities of corporate registries of requirements as part of information systems or standards of organizations is carried out. In the paper, the authors touched upon promising issues of forming automated requirements management systems. Continuing with previous publications, the authors develop issues of system integration of requirements registers and parametric standardization technologies.

Keywords: *Digital Register of Requirements, parametric standardization method, machine-readable format, machine-understandable format, organizational standard, corporate registers*

A YEAR WITH THE REGISTER OF REQUIREMENTS

The Russian construction industry has been undergoing significant changes in recent years.

The process of updating and revising norms and standards is underway, taking into account the transition to the register principle and parametric standardization. The information system "Register of requirements to be applied in engineering surveys, architectural and construction design, examination of design documentation and (or) examination of the results of engineering surveys, construction, reconstruction, major repairs, operation and demolition of capital construction projects" [1] has been operating for a year now (hereinafter referred to as the Register of Requirements), posted on the portal "Stroykompleks.RF". And for more than two years, tasks related to the transition to machine-readable and machine-interpretable regulatory and technical documentation have been actively discussed and implemented. Almost all organizations subordinate to the Ministry of Construction are involved in these tasks, adding to them the development of a unified classification system for building materials, products and structures, filling the classifier of construction information, and others [2].

In particular, after the entry into force of Federal Law No. 653-FZ of 25.12.2023 "Amendments to the Federal Law «Technical Regulations on the Safety of Buildings and Structures» and Certain Legislative Acts", the evidentiary base of technical

regulations on the safety of buildings and structures has changed:

- the basis for compliance with the requirements of the Federal Law is now the Register of Requirements;
- international standards, international codes of practice, regional codes of practice and regional standards can be used as the evidentiary base of technical regulations by law;
- organization standards (OS) are equal in their status for the evidentiary base of technical regulations to codes of practice, GOSTs and other standardization documents [3].

As another type of document, the application of which ensures compliance with the requirements of the technical regulations in the new version of Article 6 of 384-FZ (TR on the safety of buildings and structures with amendments as of December 25, 2023), the following will be considered:

- research results;
- calculations and (or) tests;
- modelling of scenarios for the occurrence of hazardous natural processes and phenomena and (or) man-made impacts, including in the case of an unfavourable combination of hazardous natural processes and phenomena and (or) man-made impacts;
- assessment of the risk of occurrence of hazardous natural processes and phenomena and (or) man-made impacts. The Register of Requirements does not provide for a division

Zvonov I.A.
Kashirina N.V.



Zvonov Ilya Alexandrovich,

Senior lecturer of the Department "Organization of Construction and Real Estate Management"; Moscow State University of Civil Engineering (National Research University) (MGSU); 26 Yaroslavl'skoe shosse, Moscow, 129337, Russian Federation; SPIN-code: 6197-7370, Scopus AuthorID: 57204363101, ORCID: 0000-0002-4854-9903; ZvonovIA@mgsu.ru



Kashirina Natalia Vladimirovna,

lecturer; Moscow Polytechnic University; 38 Bolshaya Semyonovskaya St., Moscow, 107023, Russian Federation; SPIN-code: 2752-6270, ORCID: 0000-0003-1787-441X; natalia.vk90@gmail.com

of requirements into “mandatory” and voluntary, and its creation and development are directly related to the process of converting regulatory and technical documentation of standards into a machine-readable and machine-interpretable format [4].

The next step in the modernization of the construction industry is the transition to parametric standardization. Since April 12, 2025, CP 555.1325800.2025 “System of regulatory documents in construction has been put into effect. Basic Provisions”. In addition to the fact that this document establishes the basic provisions of the system of regulatory documents in construction and is the basis for further updating and digitalization of regulatory and technical documentation, it also assumes the introduction of elements of the parametric method, which allows taking into account the characteristics of specific construction sites and regions [5]. The new standardization system described in the CP is aimed at stimulating the innovative development of the industry, improving the quality and safety of construction projects. “A clear hierarchy of requirements and other types of provisions of regulatory documents, ensuring the «modularity» of new generation standards, transparency and verifiability of the established parameters, as well as interdisciplinarity and consistency of regulatory requirements are the fundamental principles of the parametric method of standardization in construction”, said Alexander Neklyudov [2].

In relation to the digital transformation of the industry, the approval of the new CP assumes the possibility of translating the requirements of regulatory technical documents into a machine-readable format for further integration into digital tools (BIM, CAD, calculation complexes) and automation of checks and analytical scenarios. By 2030, it is planned to translate the Register of Requirements into a machine-readable format, eliminating double interpretations and discrepancies. It will be based on regulatory and technical documentation updated in accordance with the provisions of the new CP. As noted by the CP developers and experts, these steps are designed to automate the assessment of compliance of construction projects with safety and quality requirements, reduce the design and construction time, and increase the efficiency of control and supervisory activities [2]. Based on the information presented, it can be concluded that, firstly, in order to create a Register of Requirements in a machine-readable format, as well as to switch to using the parametric standardization method, it is necessary that the provisions of regulatory acts be clearly formulated and unambiguously interpreted by representatives of the professional community of architects, surveyors, designers and experts [5]. Secondly, methods or tools are needed to formalize clear and unambiguous provisions of regulatory acts in the structure of relevant documents, to extract them from texts, and to transform them into logical units for further integration into specialized software and for use in automation. Thirdly, methods and tools are needed for effective work with Registers of Requirements and Parameters, as well as for their use at all stages of the life cycle of capital construction projects.

ANALOGUES AND ALTERNATIVES

In connection with the above-described changes in approaches to regulatory control occurring in the construction industry, working with requirements registers should become a permanent practice. And following the new requirements for the design and use of regulatory documents, new requirements for specialists in the construction industry appear, when the introduction of new working methods in a large number of construction and design processes becomes necessary. At the moment, the Requirements Register

contains about 163,600 requirements from more than 1,000 documents, but as feedback from industry specialists shows, this is quite a few. In this regard, individual IT sector companies have begun developing their own registers. In particular, JSC “Kodeks” is developing the “TechExpert Requirements Register: Construction”. As the developers note, the register already contains more than 270,000 requirements extracted from more than 1,300 regulatory documents, including mandatory requirements from the Register posted on the Stroykompleks.RF portal, as well as the designer’s requirements for voluntary application from various regulatory documents [6]. It should be noted that the developers aim not only to identify requirements from as many documents as possible required by specialists, but also to ensure that these requirements are updated. At the same time, the task of updating is implemented in different ways.

What can foreign experience tell us about these issues? Most often, such solutions are related to the automation of verification of compliance of construction projects with the requirements of standards in BIM models and involve the creation of a system of rules, knowledge graphs and ontologies (automated compliance checking, ACC or Automated Compliance Checking) [7]. It should be noted that information models of buildings are used as a source of structured data in many countries. ACC consists of 4 stages: conversion of the standard into machine-readable formats, preparation of data for design (based on BIM), analysis and justification of compliance, presentation of results and reporting. Similar solutions exist in the USA — CodeComply [8], in the EU [9], and in China — Intelligent Project Verification [10]. The check is carried out on the basis of translating the standards into xml format, and then entered into a graph database to generate various intelligent scenarios. Some of the listed solutions are aimed at transforming building codes and regulations described in plain text into machine-readable documents using a domain-specific rule language, as well as automating the process of checking compliance with regulatory requirements using a semantic structure that combines processes, regulations, data and digital tools for issuing building permits. In a similar form, Registries of Requirements exist abroad. For example, in the form of codes — the International Residential Code (IRC). This is a comprehensive code that includes requirements for construction, plumbing, mechanics, gas fuel and electricity for one- and two-family homes and townhouses up to three stories high [11].

The main problems both in Russia and abroad, when developing such solutions, are high labor intensity and complexity. These include: problems with terminology, inconsistency and difficulty in finding a balance between human control and algorithmic solutions, lack of machine-interpretable norms and formalization of regulatory texts, the need for manual processing of information and its formalization, frequent changes in regulations. Therefore, the first and important steps to solve these problems are called: cooperation of regulators, developers and industry companies, parallel development and formalization of regulatory documents (creation of methods and algorithms for automation of various parts of this process), quality and uniformity of terminology.

CORPORATE REQUIREMENTS REGISTERS

The problems described are typical for developers: government agencies that create registers and IT companies that create the corresponding software. At the same time, the methods for applying registers that suit them are often not suitable for specialists on the ground. The designer is not interested in the specifics of digital document markup, semantic analysis, etc. In this regard,

a logical question arises: does a specialist need to wait until all the requirements necessary for his work are entered into the registers, and a method for their application is developed, or any IT tools are created for further work with requirements on the ground. If we allow this option, then the time required to implement the tools in work will consist of the time of waiting for a ready-made solution, as well as the time required to acquire skills in working with ready-made tools. All this lengthens the time lag and reduces the opportunities for quick implementation in work and for building your own convenient work algorithms within your company to solve specific problems. This is becoming especially important for large players who want to be innovative and to lead in their industry, as well as for small companies where there are resource constraints. At the same time, the described problems concern work with the Register of Requirements already today, and the regulator is already requiring a further transition to parametric standardization. After all, a standardization system reformatted in this way will be able to more successfully solve the problems facing construction and ensure increased safety of construction products, their reliability and quality, improve the energy efficiency of buildings, working conditions and life of citizens [12].

Therefore, it seems possible and more suitable to start working with the requirements registers in a more specific way, for example, by creating Corporate Requirements Registers, without waiting for ready-made solutions. The authors of the article offer the following definition of the Corporate Requirements Register: it is a database in which the regulatory requirements that the company applies and implements within the framework of its specific activities are structured and systematized. The Corporate Requirements Register can be part of the OS. And as was indicated above, the OS, in connection with changes in legislation, can be used as an evidence base for technical regulations. Construction OS today is a tool for a succinct and accessible presentation of the system of characteristics, requirements, parameters in relation to manufactured products or services rendered. They ensure transparency and efficiency of quality control procedures for products and processes [13].

The purpose of the Corporate Requirements Registry is to automate the control and management of requirements and facilitate the transition to parametric standardization. The tasks of the Corporate Registry:

- sorting and uploading checklists with requirements for relevant objects, processes, works, etc.;
- monitoring and updating requirements in accordance with changes in legislation in automatic or semi-automatic mode;
- assessment of compliance of completed works with requirements in automatic or semi-automatic mode;
- connection with the source of the requirement (with the relevant requirement in the Registry on the Stroykompleks.RF portal, with the requirement (document) in the professional reference system or the internal documentation fund of the company);
- relationship of the requirement with the documents to which it refers (if any);
- elimination of duplications, contradictions between requirements;
- simplification of the process of transferring the necessary requirements between company employees;
- assistance in integrating requirements into the company's internal documents, as well as into information models and specialized software;

- systematization of alternative solutions and the company's accumulated experience, research results, calculations, tests, scenario modelling, etc.

Since the Corporate Register can be supplemented with requirements reflected in the OS, the achievement of which will ensure compliance with the key requirements for functional and (or) operational characteristics, the creation and maintenance of such a register can become a step towards the transition to the parametric method of standardization. According to CP 555.1325800.2025 [14]: "Parametric method of standardization in construction: a method for establishing regulatory requirements, in which the establishment of key requirements is applied only to the functional and (or) operational characteristics of the standardization object, including in the form of requirements for quantitative parameters, regardless of its design and execution. In this case, the methods for achieving the key requirements are established with the possibility of using acceptable and (or) alternative solutions not established by regulatory documents". It is assumed that the requirements in the Corporate Registers can be associated with any source documents. Also, the Corporate Registers can have preliminary settings for typical tasks and generated collections.

CONCLUSIONS

According to the developers, the Requirements Register is still a prototype, and the inconveniences of working with it are just imperfections, and only by 2030 will it acquire the planned functionality and capabilities. Four years is a decent waiting period for a dynamically developing industry, and perhaps IT company registries, foreign analogues, or Corporate registries will have time to find and occupy certain niches in construction. This may especially concern the field of individual and non-capital construction, which is experiencing a deficit of regulatory and technical regulation even at the document level.

REFERENCES

1. Register of requirements to be applied when performing engineering surveys, carrying out architectural and construction design, conducting an expert review of project documentation and (or) an expert review of the results of engineering surveys, construction, reconstruction, major repairs, operation, and demolition of capital construction facilities in accordance with the Decree of the Government of the Russian Federation dated 31.08.2023 No. 1417. URL: <https://стройкомплекс.рф/rntd> (rus.).
2. Shirinova E. The Ministry of Construction has outlined the priorities of technical regulation in construction: the parametric method, digitalization, and a machine-readable register. 18.04.2025. URL: <https://www.all-sro.ru/news/minstroy-oboznachil-prioritety-tekhnikeskogo-regulirovaniya-v-stroitelstve-parametricheskij-metod-ts> (rus.).
3. Question-Answer: Changes in the Technical Regulations on the Safety of Buildings and Structures. Igor Alekseyev, Deputy Director of the State Expertise of the Republic of Tatarstan, answers the applicants' questions. 20.05.2025. URL: <https://gosexpertiza-rt.ru/press-center/news/vopros-otvet-izmeneniya-v-tekhnikeskom-reglamente-o-bezopasnosti-zdaniy-i-sooruzheniy/> (rus.).
4. Materials of the website of the Federal Autonomous Institution "FCC". URL: <https://taufcc.ru/deiatelnost/> (rus.).
5. The basic set of rules "System of Regulatory Documents in Construction has been approved. Basic Provisions". 18.03.2025. URL: <https://minstroyrf.gov.ru/press/utverzhen-bazovyy-svod-pravil-sistema-normativnykh-dokumentov-v-stroitelstve-osnovnye-polozheniya/> (rus.).
6. Construction Requirements Registers: How to Adapt to the New Reality. 28.07.2025. "Construction.ru". URL: <https://rcmm.ru/tehnika->

- ▶ *i-tehnologii/70631-reestry-trebovanij-v-stroitelstve-kak-adaptirovatsja-k-novoj-realnosti.html (rus.)*.
- 7. Fuchs S., Fauth J., Boden M., Amor R. *The challenge of automated compliance checking: a regulatory view. European Conference on Computing in Construction CIB W78 Conference on IT in Construction Porto, Portugal July 14–17, 2025. URL: https://mediatum.ub.tum.de/doc/1782110/q3a2hqyaxrf4aagu0iqb0x8zu.2025_Fuchs_ChallengeOfACC.pdf*
- 8. *Materials of the website codecomply.ai. URL: <https://codecomply.ai/>*
- 9. Costa G., Vakaj E., Lavikka R., Lefrancois M., Zimmermann A., Mecharnia Th. et al. *Formalization of building codes and regulations in knowledge graphs. Digital Building Permit Conference 2024: Book of Abstracts. 2024; 120-125. DOI: 10.5281/zenodo.12760551*
- 10. Lin Jia-ru, Zhou Yu-cheng, Zheng Zhe, Lu Xin-zheng. *Research and application of intelligent design review. Engineering Mechanics. 2023; 40(7):25-38. DOI: 10.6052/j.issn.1000-4750.2021.11.0908*

- 11. *Materials of the site codes.iccsafe.org. URL: <https://codes.iccsafe.org/content/lrc2021p1>*
- 12. Zvonov I.A., Kashirina N.V. *Prospects for the application of the parametric method of standardization in the context of the register principle of developing technical requirements. Real estate: economics, management. 2024; 2:73-77. DOI: 10.22337/2073-8412-2024-2-73-77. EDN LFAQSR. (rus.)*.
- 13. Zvonov I.A., Romanova G.R., Zvonova L.V., Pluzhnik A.A. *Actual problems of transition of the construction industry to the application of the organization's standards system in new conditions. Real estate: economics, management. 2024; S3:218-222. EDN VMUVQQ. URL: [https://n-eu.iasv.ru/index.php/neu/issue/view/31/40. \(rus.\)](https://n-eu.iasv.ru/index.php/neu/issue/view/31/40. (rus.))*
- 14. CP 555.1325800.2025. *System of regulatory documents in construction. Basic provisions, Ministry of Construction of Russian Federation. URL: <https://www.minstroyrf.gov.ru/docs/422272/> (rus.)*

Корпоративные реестры требований на пути развития технического нормирования в строительстве

В настоящей статье рассмотрены основные изменения в нормативно-техническом регулировании строительной отрасли, связанные с началом реализации реестрового принципа, цифровой трансформацией и поэтапным переходом к параметрическому нормированию.

Большинство происходящих изменений направлено на сокращение сроков и стоимости изысканий, проектирования и строительства, повышение качества проектной и строительной продукции. Они становятся повседневной профессиональной практикой.

Особое внимание в статье уделено реестровому принципу, предусматривающему формирование целостной системы нормативных документов, содержащих общие обязательные требования, применительно ко всем этапам жизненного цикла объектов капитального строительства. Такие реестры могут и должны содержать полный объем информации и необходимые для работы с ней инструменты, требующиеся специалисту. В связи с этим реестры все чаще называют цифровой технологией.

Кратко проанализированы результаты первого года работы цифрового Реестра требований, подлежащих применению при выполнении инженерных изысканий, проектировании, строительстве и сносе. Рассмотрены перспективы перевода данного Реестра требований в машиночитаемый и машинопонимаемый форматы, перечни решаемых задач и условия дальнейшего развития. Проведено сравнение с реестровыми инструментами, применяемыми в России и зарубежных странах. Подняты вопросы актуализации требований в рамках существующих и создаваемых реестров. Предложено обоснование применения и проведена оценка возможностей корпоративных реестров требований в составе информационных систем или стандартов организаций. В статье авторы коснулись перспективных вопросов формирования автоматизированных систем управления требованиями. В продолжение предыдущих публикаций авторы развивают вопросы системной интеграции реестров требований и технологическое параметрическое нормирования.

Ключевые слова: Цифровой Реестр требований, параметрический метод нормирования, машиночитаемый формат, машинопонимаемый формат, стандарт организации, корпоративные реестры

СПИСОК ИСТОЧНИКОВ

- 1. *Реестр требований, подлежащих применению при выполнении инженерных изысканий, осуществлении архитектурно-строительного проектирования, проведении экспертизы проектной документации и (или) экспертизы результатов инже-*

нерных изысканий, строительстве, реконструкции, капитальном ремонте, эксплуатации и сносе объектов капитального строительства в соответствии с постановлением Правительства Российской Федерации от 31.08.2023 № 1417. URL: <https://стройкомплекс.рф/mtd>

- 2. Ширинова Э. *Минстрой обозначил приоритеты технического регулирования в строительстве: параметрический метод, цифровизация и машиночитаемый реестр. 18.04.2025. URL: <https://www.all-sro.ru/news/minstroy-oboznachil-prioritety-tehnicheskogo-regulirovaniya-v-stroitelstve-parametricheskij-metod-ts>*

- 3. *Вопрос-ответ: изменения в техническом регламенте о безопасности зданий и сооружений. На вопросы заявителей отвечает заместитель директора Госэкспертизы РТ Игорь Алексеев. 20.05.2025. URL: <https://gosekspertiza-rt.ru/press-center/news/vopros-otvet-izmeneniya-v-tehnicheskom-reglamente-o-bezopasnosti-zdaniy-i-sooruzheniy/>*

- 4. *Материалы сайта ФАУ «ФЦС». URL: <https://faufcc.ru/deiatelnost/>*

- 5. *Утвержден базовый свод правил «Система нормативных документов в строительстве. Основные положения». 18.03.2025. URL: <https://minstroyrf.gov.ru/press/utverzhdenn-bazovyy-svod-pravil-sistema-normativnykh-dokumentov-v-stroitelstve-osnovnyye-polozheniya/>*

- 6. *Реестры требований в строительстве: как адаптироваться к новой реальности. 28.07.2025 // «Строительство.ru». URL: <https://rcmm.ru/tehnika-i-tehnologii/70631-reestry-trebovanij-v-stroitelstve-kak-adaptirovatsja-k-novoj-realnosti.html>*

- 7. Fuchs S., Fauth J., Boden M., Amor R. *The challenge of automated compliance checking: a regulatory view // European Conference on Computing in Construction CIB W78 Conference on IT in Construction Porto, Portugal July 14–17, 2025. URL: https://mediatum.ub.tum.de/doc/1782110/q3a2hqyaxrf4aagu0iqb0x8zu.2025_Fuchs_ChallengeOfACC.pdf*

- 8. *Материалы сайта CodeComply.Ai. URL: <https://codecomply.ai/>*
- 9. Costa G., Vakaj E., Lavikka R., Lefrancois M., Zimmermann A., Mecharnia Th. et al. *Formalization of building codes and regulations in knowledge graphs // Digital Building Permit Conference 2024: Book of Abstracts. 2024. Pp. 120–125. DOI: 10.5281/zenodo.12760551*

- 10. Lin Jia-ru, Zhou Yu-cheng, Zheng Zhe, Lu Xin-zheng. *Research and application of intelligent design review // Engineering Mechanics. 2023. No. 40 (7). Pp. 25–38. DOI: 10.6052/j.issn.1000-4750.2021.11.0908*

- 11. *Материалы сайта codes.iccsafe.org. URL: <https://codes.iccsafe.org/content/lrc2021p1>*

- 12. *Звонов И.А., Каширина Н.В. Перспективы применения параметрического метода нормирования в условиях реестрового принципа разработки технических требований // Недвижимость: экономика, управление. 2024. № 2. С. 73–77. DOI: 10.22337/2073-8412-2024-2-73-77. EDN LFAQSR.*

- 13. *Звонов И.А., Романова Г.Р., Звонова Л.В., Плужник А.А. Актуальные проблемы перехода строительной отрасли к применению системы стандартов организации в новых условиях // Недвижимость: экономика, управление. 2024. № S3. С. 218–222.*

EDN VMUVQQ. URL: <https://n-eu.iasv.ru/index.php/neu/issue/view/31/40>

14. СП 555.1325800.2025 «Система нормативных документов в строительстве. Основные положения». Минстрой России. URL: <https://www.minstroyrf.gov.ru/docs/422272/>

Об авторах: **Звонов Илья Александрович** — старший преподаватель кафедры «Организации строительства и управления недвижимостью»; **Национальный исследовательский Московский государственный строительный университет (НИУ МГСУ)**; 129337, г. Москва, Ярославское шоссе, д. 26; SPIN-код: 6197-7370, Scopus AuthorID: 57204363101, ORCID: 0000-0002-4854-9903; ZvonovIA@mgsu.ru;

Каширина Наталья Владимировна — преподаватель; **Московский политехнический университет**; 107023, г. Москва, Большая Семеновская, д. 38; SPIN-код: 2752-6270, ORCID: 0000-0003-1787-441X; kashirina@kodeks.ru.

For citation: Zvonov I.A., Kashirina N.V. Corporate registers of requirements on the path of development of technical regulation in construction. *Real Estate: Economics, Management*. 2025; 3:35-39.

Для цитирования: *Звонов И.А., Каширина Н.В.* Corporate registers of requirements on the path of development of technical regulation in construction // *Недвижимость: экономика, управление*. 2025. № 3. С. 35–39.



Игнолина. Деревянная церковь. Офорт (автор иллюстрации – Павлова Лия Иосифовна)