ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ БІЛІМ ЖӘНЕ ҒЫЛЫМ МИНИСТРЛІГІ

Л.Н. ГУМИЛЕВ АТЫНДАҒЫ ЕУРАЗИЯ ҰЛТТЫҚ УНИВЕРСИТЕТІ
КӨЛІК – ЭНЕРГЕТИКА ФАКУЛЬТЕТІ

«КӨЛІК ЖӘНЕ ЭНЕРГЕТИКАНЫҢ ӨЗЕКТІ МӘСЕЛЕЛЕРІ: ИННОВАЦИЯЛЫҚ ШЕШУ ТӘСІЛДЕРІ» Х ХАЛЫҚАРАЛЫҚ ҒЫЛЫМИ-ТӘЖІРИБЕЛІК КОНФЕРЕНЦИЯСЫНЫҢ БАЯНДАМАЛАР ЖИНАҒЫ

СБОРНИК МАТЕРИАЛОВ X МЕЖДУНАРОДНОЙ НАУЧНО – ПРАКТИЧЕСКОЙ КОНФЕРЕНЦИИ: «АКТУАЛЬНЫЕ ПРОБЛЕМЫ ТРАНСПОРТА И ЭНЕРГЕТИКИ: ПУТИ ИХ ИННОВАЦИОННОГО РЕШЕНИЯ»

PROCEEDINGS OF THE X INTERNATIONAL SCIENTIFIC-PRACTICE CONFERENCE «ACTUAL PROBLEMS OF TRANSPORT AND ENERGY: THE WAYS OF ITS INNOVATIVE SOLUTIONS»

Нұр-Сұлтан, 2022

УДК 656/621.31
ББК 39/31
А43

А43 Актуальные проблемы транспорта и энергетики: пути их инновационного решения: X Международная научно – практическая конференция, Нур-Султан, 17 марта 2022 /Подгот. Г.Т. Мерзадинова, Т.Б. Сулейменов, Т.Т. Султанов – Нур-Султан, 2022. – 597с.

ISBN 978-601-337-661-5

В сборник включены материалы X Международной научно – практической конференции на тему: «Актуальные проблемы транспорта и энергетики: пути их инновационного решения», проходившей в г. Нур-Султан 17 марта 2022 года.

Тематика статей и докладов участников конференции посвящена актуальным вопросам организации перевозок, движения и эксплуатации транспорта, стандартизации, метрологии и сертификации, транспорту, транспортной техники и технологии, теплоэнергетики и электроэнергетики.

Материалы конференции дают отражение научной деятельности ведущих ученых дальнего, ближнего зарубежья, Республики Казахстан и могут быть полезными для докторантов, магистрантов и студентов.

6. Begunov, A.A. Metrologicheskie osnovy analitiki // - SPb: RIM, 2004-416 str.
7. Lezhnina I.A., Uvarov A.A Metrologicheskoe obespechenie proizvodstva: uchebnoe posobie/ I.A.Lezhnina, A.A.Uvarov; Tomskij politekhnicheskij universitet. − Tomsk: Izd-vo Tomskogo politekhnicheskogo universiteta, 2014. – 120 str.

УДК 691.327

IMPROVEMENT OF METROLOGICAL SUPPORT OF MEANS OF NON-DESTRUCTIVE MEASUREMENT OF CONCRETE STRENGTH

Temirbolatova D.M.
d.t.m_4998m@mail.ru
Master's student of the Department «Standardization, Certification and Metrology» of the L.N.Gumilyov Eurasian National University, Nur-Sultan, Kazakhstan

Azhimgereyeva A.B.
ms.azhimgereyeva@mail.ru
Lecturer of the Department «Standardization, Certification and Metrology» of the L.N.Gumilyov Eurasian National University, Nur-Sultan, Kazakhstan

There is a direct relationship between product quality and measurement quality. In enterprises where the measuring business is established as required, the quality of products and services, as a rule, is higher. And, conversely, where the quality of measurements does not meet metrological requirements, high quality products and services cannot be expected. Thus, the level of metrological support of measurements at the enterprise directly affects the quality of products and services. In this regard, the improvement of metrological support of measurements is the most important task, the quality and competitiveness of products and services largely depends on the solution of which.

Metrological support of construction is activities related to the use of scientific and organizational methods, norms and rules, equipment necessary to achieve the unity and accuracy of measurements in the design, construction and operation of buildings and structures.[1]

The main objectives of metrological support of construction are:

- improving the quality and environmental safety of construction products;
- improving the efficiency of construction production management;
- provision of metrological support for product certification;
- improving the efficiency of experiments and tests [1].

The number of control and measurement operations in construction is constantly increasing, exceeding in some cases the number of technological operations, and errors in their implementation equally reduce the quality indicators of construction.

Measurements are the main source of information on the quantity, properties, physico-mechanical and geometric characteristics of building materials, structures and technological processes, on the basis of which accounting, management and technical improvement of all stages of the construction of buildings and structures are carried out.

The most important element of the uniformity of measurements is compliance with the uniformity of measuring instruments by ensuring that their characteristics meet the specified requirements during operation. Another component of metrological assurance - measurement accuracy - is characterized by the proximity of the results to the true value of the measured value and is achieved by establishing standards of accuracy and certification of measurement techniques.

Thus, in accordance with the definition given earlier, metrological support is practically reduced to the functioning of metrological bodies and metrological control over the design, manufacture and operation of construction products. The objectives of metrological support for the construction of buildings and structures are:

– achieving and maintaining high performance properties of buildings and structures;

– improving the efficiency of object design, reducing the development time and reducing the cost of projects;

– ensuring the unity, required measurement accuracy and reliability of measurement information;

– reduction of labor intensity of measurements and control of measuring parameters;

– ensuring constant readiness for use and effective operation of measuring instruments.

The goals of metrological support for the construction of buildings and structures are achieved by solving the following tasks:

– determination of the main directions of the use of scientific and technical achievements;

– obtaining measurement information;

– ensuring the uniformity of measurements, establishing the units of physical quantities allowed for use;

– standardization of rules and regulations in the field of metrological support for the design, manufacture and operation of construction products; determination of a rational nomenclature of measured parameters, permissible limits of their changes and standards of measurement accuracy– - establishment of a nomenclature of technical means of metrological support (their creation, storage and operation);

– analysis of the state of metrological support with the use of quantitative criteria for evaluating the effectiveness of measures to improve measurements and optimize exemplary and working measuring instruments;

– metrological examination of design and technological documentation;

– implementation of state and departmental regulatory documents.

GOST 22690-2015 establishes the main provisions of metrological support in the field of non-destructive testing, which has standardized metrological characteristics and is used for non-destructive testing during the development, production and testing of products, production and operation of products, conducting research and development work, conducting experiments and testing of products, prevention, diagnostics. [2]

Non-destructive mechanical methods are used to determine the compressive strength of concrete at the intermediate and design age established by the design documentation and at an age exceeding the design age when examining structures.

Non-destructive mechanical methods for determining the strength of concrete, established by this standard, are divided by the type of mechanical impact or determined indirect characteristics into the method:

- elastic rebound;
- plastic deformation;
- shock pulse;
- separation;
- separation with chipping;
- rib chipping.

The accuracy of strength measurement when measured by non-destructive methods can also be influenced by factors such as the type of cement and filler, its composition, hardening conditions, age of concrete, humidity and surface temperature, surface type, etc. [3-4]

According to the research of scientists [4], the main problem of non-destructive testing of the strength of concrete structures is that the indirect parameters of various non-destructive tests are influenced by changes in the physical and mechanical properties of the controlled concrete to varying degrees.

Combined control is usually understood as a multiparameter control that combines data from several physically different test methods into an overall assessment of the controlled parameter. When combining several non-destructive concrete testing methods, it is necessary to select methods that have the property of complementarity (mutual complementarity). The latter is expressed in the mutual full or partial compensation of some errors in determining the strength of concrete.[4]

List of sources used

1. Maksimova I.N. Metrologicheskoe obespechenie stroitel'stva: ucheb. Posobie / I.N. Maksimova. – Penza: PGUAS, 2013. – 336 s. ISBN 978-5-9282-0912-4
2. GOST 22690-2015 Mezhgosudarstvennyj standart «Betony. Opredelenie prochnosti mekhanicheskimi metodami nerazrushayushchego kontrolya»
3. Snezhkov D.YU. Monitoring vozvodimyh i ekspluatiruemyh zhelezobetonnyh konstrukcij nerazrushayushchimi metodami/ D.YU. Snezhkov, S.N. Leonovich. – Minsk: BNTU, 2016. – 331 s. – ISBN 979-985-550-783-4.
4. Snezhkov D.YU., Leonovich S.N. Kombinirovanie nerazrushayushchih metodov ispytaniya betona / Vestnik Brestskogo gosudarstvennogo tekhnicheskogo universiteta, 2017, № 1. – S. 87-92

УДК 006

STANDARDIZATION OF MEASUREMENT TECHNIQUES IN THE FIELD OF NANOINDUSTRY

Kabyl A.S.
qaserikkyzy1999@gmail.com
Master's student of the Department «Standardization, Certification and Metrology» of the L.N.Gumilyov Eurasian National University, Nur-Sultan, Kazakhstan

Azhimgereyeva A.B.
ms.azhimgereyeva@mail.ru
Lecturer of the Department «Standardization, Certification and Metrology» of the L.N.Gumilyov Eurasian National University, Nur-Sultan, Kazakhstan

Nanotechnology and nanoindustry products can qualitatively change people's lives. For example, it becomes possible to turn medicines into targeted agents, protecting healthy tissue from damage or directing them to the focus of inflammation. Great opportunities are also laid in the development of nanoelectronics, «smart» household appliances, long-lasting power supplies, heavy-duty building materials.

According to forecasts, in the next 8-10 years, the market for nanotechnology products will grow by more than 80%, which will require significant development of its element and regulatory framework. In this regard, an effective system of metrology and standardization is needed, consistent with international standards that ensure the reliability of the safety and quality of nanoindustry products.[1]

As you know, it is the level of accuracy and reliability of measurements that can stimulate the development of the relevant sectors of the economy or restrain it. It is especially important that in nanotechnology, the instrument-analytical and technological components work at the limit of their capabilities. This increases the probability of an error related, in addition, to the human factor.

The specificity of nanotechnology has led to the need for the emergence and rapid development of a unique direction in metrology - nanometrology, which reflects all theoretical and practical aspects related to the "correctness" of measurements in nanotechnology, including standards of units of quantities, standard samples of composition, structure, size, properties; methods and means of calibration in the nanometer and subnanometer ranges; implementation of nanoscale and much more, aimed generally at ensuring the uniformity of measurements.[2]

In this regard, metrology and standardization play a special role as key elements of the instrument-analytical, technological and intellectual components of nanotechnology and nanoindustry. The specificity of nanotechnology has led to the need for the emergence and rapid development of a unique direction in metrology - nanometrology, which is associated with theoretical and practical