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## **EVALUATION OF THE QUALITY OF CONSTRUCTION MATERIALS**

**Annotation:** This article presents an analysis of the construction quality indices as quantitative characteristics of a single or a set of properties of construction products.

**Key words:** evaluation, quality, construction materials.

**Introduction.** The needs of the market, competition, intensive development of certification and increasing demands on the part of consumers for the quality of construction products require the development of a system of indicators that objectively characterize the quality level of both individual structural elements and completed construction projects. Quality indicators describe the properties and characteristics of construction products, give their qualitative characteristics. Specific values of indicators express a quantitative characteristic (assessment) of the properties and characteristics of construction products. A quality indicator in construction is a quantitative characteristic of one or a set of properties of construction products. The choice of an indicator is a crucial point, taking into account the description of its content and a clear definition of what is reflected by this indicator. As a rule, one indicator cannot reflect certain properties of construction products, so there are usually several of them used. The number of indicators depends on the complexity of the construction object or structural element. The analysis of indicators describing these properties revealed that they are heterogeneous, in most cases their value is reflected in different units of measurement or is descriptive, and the assessment of some indicators is subjective and depends on both specific groups of participants in the investment cycle and on the opinion of consumers of construction products.

The conducted marketing research of the market of construction products and the analysis of literature sources allowed us to identify the following groups of properties that are reflected in the quality indicators of construction: social properties; functional properties; reliability; aesthetic properties; regional properties; durability; ease of use; adaptability; maintainability; environmental friendliness; economic properties.

### **Types of quality indicators**

The analysis showed that the quality indicators are in a systemic relationship with each other and arise in different periods of the investment cycle, which can be attributed to:

- pre-project preparation and design;
- production of products by construction materials enterprises;
- production of products by construction industry enterprises;
- development of organizational and technological documentation;
- production of construction and installation works;
- operation of the facility, including maintenance and subsequent repairs and reconstruction.

The study of the quality indicators of various properties of construction products has determined their great heterogeneity and dependence on many factors.

Indicators of the social properties of construction products are among the most important, as they determine the correspondence of needs in the conditions of everyday life, production and recreation. The creation of comfortable forms of life, work and recreation is provided at the stage of pre-project preparation and design. The selection of indicators that reflect the social properties of an object is a complex process that depends on many factors. As a criterion of optimality, the distances between housing, industrial and public buildings can be used, or the savings in the cost of free time to meet the needs of a person in the field of everyday life, recreation and work. Many indicators of the quality of

social properties are also subjective. For example, such an indicator as the prestige of the area or street where a residential building is located has a great influence on the market value of apartments in this house, and the estimates of this indicator by different groups of the population differ greatly from each other. Indicators of functional properties can be divided into several groups, including:

- indicators describing the spatial characteristics of buildings and structures and their individual parts;
- indicators describing the state of the air environment and comfort;
- indicators describing the light mode;
- indicators describing the sound mode;
- indicators describing the equipment of the building with modern engineering and household equipment;
- indicators describing the degree of conformity of industrial buildings and structures and their parts to their intended functional purpose;
- indicators that reflect the safety of the operation of buildings and structures.

Quality indicators that reflect the functional properties of buildings, structures and their parts have a physical basis and a numerical value that can be represented in various units of measurement. The choice of indicators and their measurement units should be carried out in a systematic relationship. So, for example, one of the components of creating comfortable conditions that ensure the normal return of heat from a person to the environment are the parameters of the air in the room and the temperature of the surrounding surfaces. This is primarily the temperature, relative humidity and air velocity, the temperature of the internal and external surfaces of enclosing structures. These indicators, in turn, depend on a number of others: the thickness and thermal resistance of fences, the efficiency of heating and ventilation systems, compliance with current standards, project documentation, etc.

Quality indicators that describe the reliability properties of construction products characterize structural elements, components, buildings and structures as a whole to perform their functions steadily, maintaining operational performance in the specified modes even in the presence of individual failures and failures. This group of indicators can be determined by using statistical methods for estimating tolerances when considering analytical expressions of schemes of load-bearing or enclosing structures. The correct choice of reliability indicators allows you to successfully plan and carry out a complex of maintenance and further repair of buildings and structures.

Indicators of the aesthetic properties of the quality of construction products, taking into account the regularity of emotional and visual perception, in accordance with the concepts accepted in architecture, include: ensembles, scale, dynamism, architectonics, symmetry, plasticity, contrast, rhythm, color, texture and structure. The most convenient tool used to study the aesthetic properties of construction products is the method of expert assessments.

Indicators of regional properties that reflect the location of the object affect the attractiveness of construction products from different groups of the population and, accordingly, the market value. In most cases, these indicators are subjective in nature and over time, with the development of the region, transport communications, etc., their assessment may change.

Quality indicators that describe durability reflect the properties of construction products to perform the required functions and maintain operational qualities during the intended service life. Durability indicators are studied by studying the operated buildings and structures, conducting laboratory and field experiments, and analytical developments. The processability of design solutions for construction products is a set of technical properties of planning and volumetric design solutions that meet the requirements of construction production technology. There are three groups of technological performance indicators:

- manufacturability of construction materials, parts and structures;
- processability of transportation;
- technological efficiency of construction of a construction object.

Quantitative assessment of quality indicators that reflect technological effectiveness can be analytically expressed in terms of labor intensity, material intensity, duration, cost, etc.

Maintainability properties are characterized by quality indicators that reflect the adaptability of buildings and structures to detect and eliminate the causes of structural element failures with minimal expenditure of labor and material resources. Currently, there is no well-established system of units for quantifying the maintainability of buildings and structures, covering all aspects of this property. Two main indicators of maintainability are used: the probability of restoring a building, structure, or its elements in a given time, and the average recovery time. Quality indicators that reflect the properties of environmental friendliness can be represented by separate groups, the main of which are:

- the state of the atmosphere, including the composition of air, dust and fumes, no odors, etc.;
- cleaning, the destruction and waste management, landscaping;
- measures to protect against electromagnetic radiation and radiation pollution;
- indicators of the impact of buildings and structures in the course of their operation on the environment;
- indicators of visual environment comfort.

The economic properties of construction products are expressed in terms of cost, which can relate to individual structural elements and parts of buildings and structures, as well as to construction objects as a whole.

An objective assessment of the quality of construction products is possible only on the basis of the analysis of indicators that characterize the corresponding properties of buildings, structures, their parts and individual structural elements.

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