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WAYS TO IMPROVE THE MECHANISM FOR ASSESSING THE QUALITY OF CONSTRUCTION WORKS

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ABSTRACT

The quality of construction works is one of the main means of competitiveness in the field. Objective and rapid assessment of quality in construction is an urgent scientific and methodological problem. Many developments have been devoted to this problem, but no unified approach has been developed to date. In this article, the authors proposed an improved economic mechanism for assessing the quality of works in construction.

Keywords: construction works, quality, quality assessment

INTRODUCTION

Resolution number-4586 of the President of the Republic of Uzbekistan dated February 5, 2020 "On measures to fundamentally improve the quality of construction and assembly works and to improve the construction control system" provides a number of organizational measures to improve the mechanism of improving the quality of construction works, which is one of the main links in ensuring the quality of construction products.[1]

As part of construction works, the value of quality should be evaluated in the first place by quality factors in the volume of construction works. Based on the theory of quality management, any work or product is divided into two types: performed with high quality and performed with low quality.

High-quality work meets the requirements in one execution. In this case, all production costs will be focused on the creation of the product, and unnecessary and ineffective spending will not be allowed. Therefore, the added value created in a high-quality product will be at a high level. Poor quality work (product, service) should be understood as the presence of additional costs in processing raw materials, organizing production, providing it to the consumer, etc., in addition to socially necessary expenses.

The consumption value of the finished product is fully ensured, that is, according to market laws, the consumer pays only for quality products, but additional resources are spent for its creation. This will cause a decrease in the exchange value of the product.

ANALYSIS OF THE LITERATURE

The problem of quality assessment in construction remains the focus of attention of many scientists. For example, the research carried out by A.V. Belov is mainly related to quality control measures in the provision of construction processes.[2] According to his definition, the

control of the quality of construction and assembly works is mainly aimed at determining and ensuring the compliance of the performed works, used materials, products and structures with the project and regulatory requirements.

In some researches dedicated to the evaluation of the quality of construction works, the same evaluation method has been studied.[3] In the research carried out by the authors, the concept of "relative description of quality" is included in the assessment of the quality of construction and installation procedures. In this case, the quality level can vary from 0 to 1.25. A construction process rated excellent is understood as exceeding the standard requirement and is considered worthy of a grade of 1.25. The quality of the construction phase, which is recognized as good, receives a score of 1.0. The quality of work performed satisfactorily is considered lower than the requirement and receives a score of 0.75.

According to S.V. Samoryadov, A.A. In Schreiber's scientific research, the quality of construction works is seen as an indicator of the reliability of construction products.[4] According to them, the quality of the construction process cannot be separated from the design and engineering works, therefore it is appropriate to evaluate the quality of the construction in a comprehensive manner.

Supporters of a systematic approach to quality management in the field of construction emphasize the need for a unified approach to quality management at all stages of the life cycle of construction products.[5] According to the authors' conclusions, the introduction of quality management principles in the field of construction can guarantee the quality of construction products.

A.X. Bayburin's researches deserve to attention in the evaluation of the quality of the construction process.[6] In its developments, the method of considering defects was used for the assessment of construction works. In this case, defects encountered in construction and assembly work are classified as critical, serious and of low importance.

RESEARCH METHODOLOGY

Systematic approach, abstract-logical thinking, grouping, comparison, factor analysis, selective observation methods were used in the research process

ANALYSIS AND RESULTS

It can be concluded that although there is not a single approach among scholars dealing with the quality of construction work, there are similarities in their opinions.

We would like to draw attention to the issue of improving the internal systems of construction quality management in organizations, taking into account the existence of many shortcomings in the existing procedures and the fact that construction works do not meet today's requirements. One of the main principles of the stage of construction and assembly work is to carry out all the work in full accordance with the project, in accordance with the intended technologies.

If the implementation of the project requirements is monitored by the customer, the designer and state control bodies, the construction technology is often an internal problem of the organizations. In this regard, assessment of the quality of construction works is an urgent scientific-methodical problem [7,8].

In order to increase the effectiveness of quality control, the results should be summarized for different groups and, if necessary, express an objective assessment. Taking into account the reforms in the field of construction in Uzbekistan and the need for the quality of construction to fully meet world standards, we determined that the following principles should be followed when assessing the quality of construction works:

– Quality control of the identification object. The essence of this principle is that the used evaluation method and indicators should match the evaluation object;

– The principle of objectivity of the evaluation, that is, it is necessary to ensure the accuracy of the object quality level of the evaluation results. We believe that the objectivity of assessment is the main factor that ensures the effectiveness of quality management practices;

– The principle of quantitative expression in quality assessment. The implementation of this principle allows to distinguish different levels of quality and leads to appropriate conclusions;

– It is necessary to maintain a set of documents on the principle of being based on facts, that is, the formation of quality on the construction site;

– Based on the principle of simplicity and low cost of the assessment, it can be considered as an economic source of the organization of the control service, which is relevant for almost all construction objects.

The basis for the application of the above principles in practice is the formation of an appropriate organizational environment at the construction site. This environment serves to ensure that workers and engineering technicians have the same approach to quality during construction, that is, all participants are equally responsible for quality.

We have accepted as a basis that the quality control system in the construction object will consist of the following elements: the number of control objects, the time costs of the quality control operation, the periodicity of the control, the level of the subject's personal participation in the control.

The manager uses the following forms of quality control based on the tasks assigned to him:

a) Input control, that is, acceptance of construction materials and constructions brought to the object in terms of quantity and quality. The total time spent (T1) required by this control during the shift is determined by the following formula:

$$T_1 = \sum q_i * N_i, \quad i = 1...m \qquad (1)$$

Here: $i = 1...m$ - number of accepted material names;

q_i - Time limits for determining and formalizing the quantity and quality of material, minutes;

N_i - the number of material receptions during the shift.

б) Operational control. This type of control includes the fulfillment of technological requirements as well as the quality of workers' labor flows during the shift. Operational control can be carried out by both the supervisor and the foreman. In general, the time costs required for operational control (T2) are determined as follows:

$$T_2 = \sum q_j * N_j * К_1, \quad j = 1...n \qquad (2)$$

Here: $j = 1...n$ - the number of types of operational control;

q_j - j- time of work quality control, minutes;

N_j - the required number of inspections of job j during the shift;

$К_1$ – the coefficient of transfer of tasks to the master or foreman ($К_1$= from 0,5 to 0,8).

в) Acceptance control, that is, acceptance of work at the end of the shift or at the end of the work from the brigade (from another performer) in terms of quantity and quality. The time spent on this control is determined by the following formula:

$$T_3 = \sum q_k * N_k, \quad k = 1…p. \qquad (3)$$

Here: k = 1…p - the number of jobs to be accepted during the shift;

Q_k - k- unit of work acceptance time, minutes;

N_k - acceptable volume of work.

If we collect the time costs determined using the above formulas, we will determine the time resources necessary to control the quality of construction and assembly work during the shift:

$$T_3 = (T_1 + T_2 + T_3) / К_б \qquad (4)$$

Here: $К_б$ = the coefficient of combining quality control operations, i.e. the coefficient that takes into account the simultaneous conduct of several types of control, $К_б$ = 1,5 ... 1,6.

Modern theories of quality management distinguish two groups of quality-related costs in construction enterprises: planned costs, that is, costs of defect prevention and quality control, and external and internal losses related to defects. In general, they can include the following (Table-1).[1]

Table-1 **The structure of costs related to quality**

№	Cost group	Content
1	Defect prevention (preventive) costs	Quality management costs: costs associated with the implementation of quality systems and their operation; Process management costs: costs related to quality plans and maintenance of activities; Costs of quality control and measuring equipment: equipment and equipment, measuring instruments and their operating costs; Costs related to supply quality: costs of obtaining quality assurance from suppliers; Costs of developing and implementing quality improvement programs; Costs of training employees in the field of quality; Other expenses for the prevention of defects (according to the characteristics of enterprises).
2	Quality control costs	Costs of quality control in production; Cost of materials used in quality control; The costs of delivering the finished product to the customer; Costs associated with product quality assurance; Other ongoing costs related to quality assurance.
3	External and internal losses due to defects	**A) internal losses:** Losses due to defective product being issued; Losses related to the correction of defects; Costs of analysis of losses, costs of determining the cause of the defect; Losses due to reduction of quality requirements; Losses related to the price impact of a decrease in product quality; Losses related to the deliverers; Other internal losses. **Б) external losses:** Costs related to non-acceptance of work; Costs associated with bringing the product back to standard; Costs of commercial court and legal disputes; Losses associated with a reduction in market position (sales volume).

[1]Розанова С.К., Истомин А.С.Затраты на качество: состав и классификация в современных условиях хозяйствования. Журнал“Теория и практика сервиса: экономика, социальная сфера, технологии”№ 3 (25). 2015. - с.33. https://cyberleninka.ru/article/n

We suggest using this approach when creating an organizational-economic mechanism of quality assessment.

DISCUSSION

It is necessary to solve a number of scientific methodological problems when relying on costs in the assessment of the quality of construction works: to clarify the sources of costs in terms of quality; formation of an information base on quality-related costs; formation and development of a digitized quality control system; development and justification of cost standards in quality assessment.

In finding a solution to these problems, we developed a mechanism for assessing the quality of construction work in objects (Figure-1).

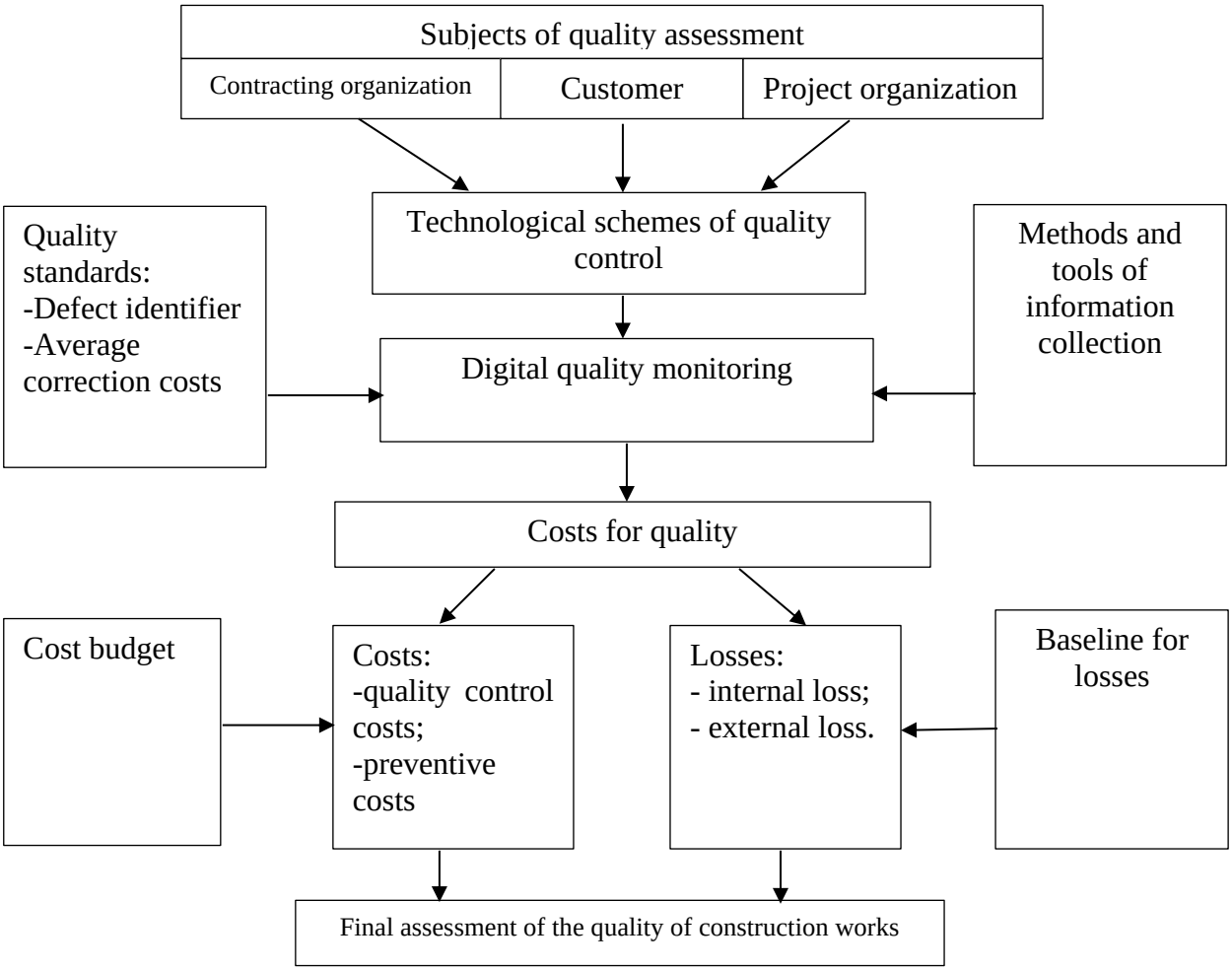

Figure-1. A mechanism for assessing the quality of construction work at the facilities.

In order to explain the essence of this mechanism, we will focus on the following. Separate information bases of assessment subjects will be harmonized for the centers of formation and storage of information on quality. Technological schemes of quality control, which are uniform for all subjects, will be introduced to organize quality control. They will specify the periodicity, methods, tools and procedures of quality control.

Quantification is the most important aspect of quality assessment. In this case, the identifiers of the quality control objects occupy an important place. We understand the identification of the object as the creation and systematization of a separate code of deviations and defects for each type of work or construction. At the same time, in digitalization of quality control, on the one hand, extensive use of modern methods and tools of information gathering, and on the other hand, the creation of a base of economic standards for quality, serves as a close part of the assessment.

CONCLUSION

The results of the digital monitoring of quality control determine the size and composition of quality costs, that is, they help to determine the amount of planned costs and losses.

It is when these costs are compared with the base numbers that an objective and objective assessment of the overall quality of construction works is formed.

This methodology covers not only various forms of quality control, but also forms a quality database. And for the management system, systematic information will greatly help to develop effective measures. It should be noted that our proposals include the implementation of technical quality control methods. When the time for laboratory quality control, inspection control and various tests at the facility is calculated in other ways, entering the results into a single database is a simple technical solution.

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