IMPROVEMENT OF COST ANALYSIS OF CONSTRUCTION AND INSTALLATION WORKS: USING THE EXAMPLE OF ELECTRICAL INSTALLATION WORKS IN UZBEKISTAN

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Abstract: It is known that the COVID-19 pandemic is affecting all sectors and industries of the global economy. In such a situation, issues such as a steady population growth trend, achieving sustainable economic development, ensuring the well-being of the population, creating permanent jobs, and reducing the cost of products (works, services) are on the agenda. In construction companies, it is important to identify the existing opportunities to reduce the cost of construction work performed by customers under contracts and to ensure control over the costs incurred. This article analyzes the share of cost items in the cost of construction work performed by construction organizations, the plan for the implementation of construction and repair work and the actual cost, and develops a methodology for determining the i element. Recommendations for improvement of the methodology for analyzing the operating costs of machinery in the cost of construction and installation work performed by construction companies are given.

Key words: analysis, cost of construction work, material cost, work performance, wages, operating costs of machinery

Introduction

At the international level, the escalation of the pandemic, the deepening economic crisis is affecting all sectors and industries of the economy. In such a situation, issues such as the steady growth of the population, the achievement of sustainable economic development, ensuring the welfare of the population are on the agenda. It is known that the development of the construction industry contributes to the rapid development of various sectors of the national economy. The current accounting procedures in construction companies have several shortcomings. Existing normative documents do not take into account the fundamental features of the construction industry. Also, the forms and types of accounting and economic analysis in the industry are not fully adapted to the requirements of management in terms of their content. This hurts management decisions, rational use of resources, ensuring operational efficiency. Several factors in construction, such as seasonality,
the longevity of production, location of the object, create difficulties in the organization of operational activities. As a result, the cost of the construction project is formed under the influence of the above factors and exceeds the established estimate standards. It is also required to analyze the impact of construction costs on the quality level of the construction object by analyzing the information related to the operational activities of construction organizations. Therefore, today there is a need to conduct research aimed at improving the analysis of operational accounting in construction companies. Analysis of the cost of products works, and services are extremely important. It allows you to identify trends in the change in this indicator, fulfillment of the plan according to its level, to determine the influence of factors on its growth and, on this basis, to assess the work of the enterprise in using the opportunities and to establish reserves for reducing the cost of production.

**Literature review**

Cost analysis of products (works, services) is studied in the economic literature by local and foreign scientists. In particular, economists of the country A.V. Vahobov, A.T. Ibragimov, and N.F. Ishankulov describes: "Production cost is an indicator that reflects all aspects of the financial and economic activity of the enterprise"[1].

T.K. Qudratov, M.M. Ibragimov, Z.H. Karimova note that "Production cost is the monetary expression of costs associated with the production of goods"[2]. CIS scientists L.E. Krasilnikova, E.G. Sysueva, M.S. Farenyuk say that "Production cost serves as a general indicator of the organization's production performance"[3]. Cost of production is a term to show the sacrifice of economic resources in the processing of raw materials into finished products [4]. According to Hanggana, the cost of production is all costs incurred to make one unit of finished goods covering the cost of raw materials, direct labor costs and factory overhead costs [5].

Based on the approaches expressed by the above economists, the cost of construction work is the cost of work performed based on contracts with customers, the amount of which predetermines the financial results of the organization for the reporting period. The analysis of the cost of construction work performed by national and foreign economists based on contracts with customers in construction organizations has not been studied. To this end, our research focuses on the organizational and methodological aspects of a cost analysis of construction works. The main purpose of the cost analysis of contracts with customers is to identify
unsustainable, inefficient costs, as well as to develop cost reduction guidelines.

Results and discussion

When analyzing the cost of construction work, it is necessary to start with an assessment of its structure, as it allows to identify the objects or cost elements that are most sensitive to change. Types of cost grouping are used in accounting and analysis of costs that make up the cost of the product (Figure 1). Figure 1 shows the main directions of the analysis of production costs, the study of the cost of construction work based on calculation (cost) items, we think, will be the main criterion for the formation of clear conclusions and correct management decisions. To analyze the cost structure of construction work performed under contracts with customers, it is necessary to calculate and evaluate the share of each item or element in the total cost. The following formula is used to determine the share \( Z_i \) of each item or element in the total cost of construction work:

\[
Z_i = \frac{D_i}{C} \quad (1)
\]

where \( D_i \) is the cost of the item or element in the actual, planned or estimated cost of the construction work;

\( C \) is the actual, planned or estimated cost of construction work. The following formula is used to study the level of costs for item (or element) of the volume of construction work performed and transferred to the customer for one sum:

\[
T_i = \left( \frac{D_i}{B} \right) \times 100\% \quad (2)
\]

where, \( B \) is the cost of construction cost (contract price).
Since the state share of JSC "Elektrqishloqqurilish" is 57% and fulfills the state order, there is no difference between the estimated costs for construction and installation work under this project and the actual costs (Table 1).

**Table 1**

**Cost structure of construction works performed by MK-11 department of JSC "Elektrqishloqqurilish" (million sums)**

<table>
<thead>
<tr>
<th>№</th>
<th>Cost structure</th>
<th>Plan</th>
<th>Real</th>
<th>The difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wage costs of construction workers</td>
<td>8660,6</td>
<td>8580,4</td>
<td>-80,2</td>
</tr>
<tr>
<td>2</td>
<td>Material costs</td>
<td>147952,3</td>
<td>147872,6</td>
<td>-79,7</td>
</tr>
<tr>
<td>3</td>
<td>Depreciation of machinery</td>
<td>16631,2</td>
<td>16793,8</td>
<td>+162,6</td>
</tr>
<tr>
<td>4</td>
<td>Preparation and storage costs</td>
<td>2959,0</td>
<td>2957,4</td>
<td>й-1,6</td>
</tr>
<tr>
<td>5</td>
<td>Shipping costs</td>
<td>5266,27</td>
<td>5297,21</td>
<td>+30,94</td>
</tr>
<tr>
<td>6</td>
<td>Transportation costs for cable and</td>
<td>636,7</td>
<td>696,1</td>
<td>+59,4</td>
</tr>
<tr>
<td></td>
<td>wire products</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Other expenses</td>
<td>44197,4</td>
<td>44105,96</td>
<td>-91,44</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>226303,47</strong></td>
<td><strong>226303,47</strong></td>
<td></td>
</tr>
</tbody>
</table>

Based on the above formula 1, using the data in Table 3.2, the share of wage costs in the total cost of construction work performed by the department MK-11 of

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1. Developed by the author as a result of research
2. Developed by the author as a result of research
JSC "Elektrqishloqqurilish" according to the plan $Z_p^{w} = 8660.6 / 226303.47 = 0.0383$, the share of operating costs of machinery $Z_p^{mc} = 16631.2 / 226303.47 = 0.0734$, the cost of materials $Z_p^{mat} = 147952.3 / 226303.47 = 0.6539$, the cost of preparation and storage of materials $Z_p^{ms} = 2959.0 / 226303.47 = 0.0131$, transportation costs of heavy construction materials and machinery $Z_p^{omt} = 5266.27 / 226303.47 = 0.0232$, transportation costs for transportation of cable and wire products $Z_p^{tc} = 636.7 / 226303.47 = 0.0028$, while other costs can be seen to have $Z_p^{oc} = 44197.4 / 226303.47 = 0.1953$.

**Figure 2. Analysis of the share of cost items in the planned cost of construction work performed by JSC "Elektrqishloqqurilish"**

We can see that the largest share of material costs in the cost of construction work performed by JSC "Elektrqishloqqurilish" is 0.6539. Figure 3.2 shows the analysis of the share of cost items in the actual cost of construction work performed by JSC "Elektrqishloqqurilish".

**Figure 3. Analysis of the share of cost items in the actual cost of construction work performed by JSC "Elektrqishloqqurilish"**

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3 Developed by the author as a result of research  
4 Developed by the author as a result of research
Analysis of cost items on the actual cost of construction work performed by JSC "Elektrqishloqqurilish" The share of wage costs $Z_{w}^r = \frac{8580.4}{226303.47} = 0.0379$, the share of operating costs of machinery $Z_{mc}^r = \frac{16793.88}{226303.47} = 0.0744$, material costs $Z_{mat}^r = \frac{147872.6}{226303.47} = 0.6534$, material preparation and storage costs $Z_{ms}^r = \frac{2957.4}{226303.47} = 0.0130$, transportation costs of heavy construction materials and machinery $Z_{omt}^r = \frac{5297.21}{226303.47} = 0.0235$, transportation costs for cable and wire products are $Z_{tc}^r = \frac{696.1}{226303.47} = 0.003$, other costs are $Z_{oc}^r = \frac{44105.96}{226303.47} = 0.1948$ indicates that it has reached. The above analysis of the share of cost items in the actual cost of construction work performed by JSC "Elektrqishloqqurilish" allows you to analyze the changes in the actual cost of construction items relative to the plan (Figure 3.3).

**Figure 4. Analysis of the share of cost items on the plan and actual cost of construction work performed by the 11th department of JSC "Elektrqishloqqurilish"**

Results of the analysis -0.0004 on wages, -0.0005 on material costs, operating costs of machinery -0.001, preparation of materials and storage costs -0.0001, transportation costs of heavy types of construction materials and machinery +0.0002, transportation costs for transportation of cable and wire products +0.0002, other costs - 0.0005. The analysis of the level of expenditures for one sum of the volume of construction work performed by JSC "Elektrqishloqqurilish" using the above formula 2 is given in Table 2.

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Developed by the author as a result of research
Table 2

Analysis of the level of expenditures for one sum of the volume of construction work performed by JSC "Elektrqishloqqurilish" 6

<table>
<thead>
<tr>
<th>№</th>
<th>Cost expenditure items</th>
<th>Plan</th>
<th>Real</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wage costs of construction workers</td>
<td>3,684</td>
<td>3,650</td>
</tr>
<tr>
<td>2</td>
<td>Material costs</td>
<td>62,946</td>
<td>62,912</td>
</tr>
<tr>
<td>3</td>
<td>Depreciation of machinery</td>
<td>7,075</td>
<td>7,145</td>
</tr>
<tr>
<td>4</td>
<td>Preparation and storage costs</td>
<td>1,259</td>
<td>1,258</td>
</tr>
<tr>
<td>5</td>
<td>Shipping costs</td>
<td>2,240</td>
<td>2,253</td>
</tr>
<tr>
<td>6</td>
<td>Transportation costs for cable and wire products</td>
<td>0,271</td>
<td>0,296</td>
</tr>
<tr>
<td>7</td>
<td>Other expenses</td>
<td>18,804</td>
<td>18,766</td>
</tr>
<tr>
<td>8</td>
<td>Project costs (T_L)</td>
<td>3,694</td>
<td>3,694</td>
</tr>
<tr>
<td>9</td>
<td>Laboratory expenses (T_LC)</td>
<td>0,026</td>
<td>0,026</td>
</tr>
<tr>
<td>10</td>
<td>VAT (T_VAT)</td>
<td>0,0</td>
<td>0,0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100,0</td>
<td>100,0</td>
</tr>
</tbody>
</table>

The results of the analysis show that the volume of construction work performed by JSC "Elektrqishloqqurilish" and transferred to the customer for one sum in relation to the plan under Article i is actually at the level of costs $T_w = -0.035$, $T_{mc} = -0.034$, material costs $T_{mat} = +0.07$, the cost of preparation and storage of materials $T_{ms} = -0.001$, the cost of transportation of heavy construction materials and machinery $T_{omt} = +0.013$, the cost of transportation of cable and wire products $T_{tc} = +0.025$, and other costs $T_{oc} = -0.038$ deviations occurred indicates that.

The results of the analysis show that material costs have the largest share in the cost of construction work associated with the implementation of contracts with customers. According to the Global Construction Organization, material costs account for about 60% of the cost of construction work and about 45% of the main production share 7. As a result of the constant increase in the share of material costs in the industrialization of the construction industry, even small deviations from the planned figure in the dynamics of material costs have a significant impact on the cost of construction work performed under contracts with customers.

The deviation in material costs is determined as a result of:
- the volume of work performed in natural units (for each type of construction work);

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6 Developed by the author as a result of research
7 Developed by the author as a result of research
material consumption for each unit of work performed;
- cost of purchased material.

For material cost item analysis, we consider it appropriate to determine the plan and actual costs incurred by material types using the following formula:

\[ M_{mp} = H_p \times X_p \times B_p \] (3)
\[ M_{mr} = H_r \times X_r \times B_r \] (4)

where, \( M_{mp} \) and \( M_{mr} \) - actual and planned costs by type of material;
\( H_p \) and \( N_r \) - actual and planned volumes of work performed in natural units (for each type of construction work);
\( X_p \) and \( X_r \) are the actual and planned rates of material consumption for each unit of work performed in natural units;
\( B_p \) and \( B_r \) are the actual and planned prices of consumables.

The following formula should be used to determine deviations from the actual material cost plan:

\[ \Delta M_m = M_{mr} - M_{mp} \] (5)

The effect of the factor associated with the change or replacement of materials (types) in construction work performed under contracts with customers should be assessed according to the above formulas, as the replacement of materials has a direct impact on the volume of work and material nomenclature, resulting in deviations from the plan.

In terms of workload,

\[ \Delta M_{mp} = (H_r - H_p) \times X_p \times B_p \] (6)

According to the normative material consumption,

\[ \Delta M_r = (X_r - X_p) \times H_r \times B_r \] (7)

At the unit price of the material,

\[ \Delta M_b = M_{mr} - M_{mp} = \Delta M_{mp} + \Delta M_r + \Delta M_{mb} \] (8)

Table 3.7 shows that the MK-11 department of JSC "Elektrishloqqurilish" deviated from the cost of construction of the new two-storey high-voltage 220 kV Turakurgan TES - Yulduz substation with the expansion of Yulduz substation by 2 cells, including, \( M_{m1} = 256283.6 \) thousand sums for intermediate base semi-finished products of P220-2 NS type power transmission...
lines, $\Delta M_{m2} = 38383.6$ thousand sums for intermediate base semi-finished products for P220-2 NS + 5 type power transmission lines, $M_{m3} = 177237.9$ thousand sums for intermediate base semi-finished products for P220-2T NS type power transmission lines, $\Delta M_{m4} = 22445.0$ thousand sums for intermediate base semi-finished products for PC220-2 type power transmission lines, PK-1A steel bet $M_{m5} = 205716.5$ thousand sums for semi-finished concrete floor slabs, $\Delta M_{m6} = 128112.6$ thousand sums for trapezoidal reinforced concrete, which increases the lifting properties of the foundation Rigel AR-5, Rigel AR-6 foundation $M_{m7} = 660.5$ thousand sums for trapezoidal reinforced concrete semi-finished products, $M_{m8} = 86.5$ thousand sums for GPG-1,6-11-400 / 13 vibration-reducing steel-aluminum bar semi-finished products, which increases the lifting properties of vibration-reducing steel-aluminum barrier GPG-3,2-13-550 / 31 on semi-finished products $\Delta M_{m9} = 11692.7$ thousand sums, vibration-reducing steel-aluminum barrier GPG-3,2-13-550 / 31.1 on semi-finished products $\Delta M_{m10} = 4696.4$ thousand sums, $M_{m11} = 8479.7$ thousand sums for clamp semi-finished product to strengthen steel-aluminum barrier of PGN-5-3 type, $M_{m12} = 57400.5$ thousand sums for PS 160d type glass insulator semi-finished product, We can see that the wire cross section of AS400 / 51 type steel aluminum increased by $\Delta M_{m13} = 8.6$ hundred thousand sums, while other materials decreased by $\Delta M_{m14} = 875451.5$ thousand sums. The change in the actual unit cost of consumed materials affected the deviation of actual material costs from the plan by $\Delta M_m = +79707.0$ thousand sums.

Analysis of labor costs for construction work performed under contracts with customers allows us to identify the factors that cause overhead costs by identifying and assessing the deviation of actual costs from the norm (or planned). Deviation of calculated labor costs for construction works occurs under the influence of the following factors:

- changes in the composition of construction work in terms of labor intensity;
- non-compliance with the qualifications of workers provided for in the estimate and regulatory framework (high assessment of the categories of workers in relation to the categories of work);
- low quality of construction materials and structures;
- low quality of work;
- non-compliance with the level of mechanization of work. In our opinion, in the analysis of the item of salary expenses, we consider it expedient to analyze the salary fund and its distribution by cost. According to A.S. Akintoe and M.J. MacLeod, the distribution of the salary fund by cost items and the detection of deviations from the planned amount of actual expenditures allows determining the impact of changes in the salary fund on the cost [6]. A.N.Asaul, M.K.Starovoytov, R.A.Faltinsky note that the size of the salary fund in construction companies depends on the average salary and the number of employees[7]. We believe that the surplus (savings) of the salary...
fund due to an increase or decrease in the number of employees should be determined by the change in the planned average salary and the number of employees:

$$\Delta I_d = O_p \times (E_r - E_p)$$  \hspace{1cm} (9)

where, $\Delta I_d$ is the change in the salary fund;
$O_p$ - planned average salary;
$E_r$ - the number of actual cases;
$E_p$ - the planned number of workers.

The surplus (savings) of the salary fund as a result of an increase (or decrease) in the level of the salary fund relative to the planned level should be determined on the basis of the following formula:

$$\Delta I_d = E_x \times (O_r - O_p)$$  \hspace{1cm} (10)

where, $O_r$ is actually the average wage.
Table 3. Plan and actual material costs for construction works performed by MK-11 department of JSC "Elektrishloqqurilish" (thousand sums)\(^8\)

<table>
<thead>
<tr>
<th>№</th>
<th>Name of materials</th>
<th>Unit of measurement</th>
<th>Price (sum)</th>
<th>Plan</th>
<th>Real</th>
<th>The difference ((\text{-},\text{+}))</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intermediate base for P220-2 NS type power transmission lines</td>
<td>Kiloton</td>
<td>86947,7</td>
<td>186</td>
<td>16172272,2</td>
<td>186</td>
</tr>
<tr>
<td>2</td>
<td>Intermediate base for power transmission lines of type P220-2 NS + 5</td>
<td>Kiloton</td>
<td>110846,7</td>
<td>28</td>
<td>3103707,6</td>
<td>28</td>
</tr>
<tr>
<td>3</td>
<td>Intermediate base for P220-2T NS type power transmission lines</td>
<td>Kiloton</td>
<td>80800,2</td>
<td>21</td>
<td>1696804,2</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>PC220-2 (intermediate base for PC220-2 type power lines)</td>
<td>Kiloton</td>
<td>76993,6</td>
<td>41</td>
<td>3156737,6</td>
<td>41</td>
</tr>
<tr>
<td>5</td>
<td>Slab PK-1A (Reinforced concrete floor slab)</td>
<td>Piece</td>
<td>5411,793</td>
<td>2052</td>
<td>11104999,2</td>
<td>2052</td>
</tr>
<tr>
<td>6</td>
<td>Rigel AR-5 (trapezoidal reinforced concrete, which increases the lifting properties of the foundation)</td>
<td>Piece</td>
<td>700,650</td>
<td>2646</td>
<td>1853919,9</td>
<td>2646</td>
</tr>
</tbody>
</table>

\(^8\) Developed by the author as a result of research
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Cost 1</th>
<th>Cost 2</th>
<th>Cost 3</th>
<th>Cost 4</th>
<th>Cost 5</th>
<th>Cost 6</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Rigel AR-6 (trapezoidal reinforced concrete, which increases the lifting properties of the foundation)</td>
<td>Piece</td>
<td>1138,127</td>
<td>816</td>
<td>928711,6</td>
<td>816</td>
<td>929372,1</td>
<td></td>
<td></td>
<td>+660,5</td>
</tr>
<tr>
<td>8</td>
<td>Vibration reducing steel aluminum barrier GPG-1,6-11-400 / 13</td>
<td>Piece</td>
<td>115,3</td>
<td>39</td>
<td>4496,7</td>
<td>39</td>
<td>4583,2</td>
<td></td>
<td></td>
<td>+86,5</td>
</tr>
<tr>
<td>9</td>
<td>Vibration reducing steel aluminum barrier GPG-3,2-13-550 / 31</td>
<td>Piece</td>
<td>178,0</td>
<td>2338</td>
<td>416164,0</td>
<td>2338</td>
<td>427856,7</td>
<td></td>
<td></td>
<td>+11692,7</td>
</tr>
<tr>
<td>10</td>
<td>Vibration reducing steel aluminum barrier GPG-3,2-13-550 / 31.1</td>
<td>Piece</td>
<td>180,0</td>
<td>1874</td>
<td>337320,0</td>
<td>1874</td>
<td>342016,4</td>
<td></td>
<td></td>
<td>+4696,4</td>
</tr>
<tr>
<td>11</td>
<td>Clamp for strengthening steel-aluminum barrier type PGN-5-3</td>
<td>Piece</td>
<td>335,855</td>
<td>1862</td>
<td>625362,0</td>
<td>1862</td>
<td>633841,7</td>
<td></td>
<td></td>
<td>+8479,7</td>
</tr>
<tr>
<td>12</td>
<td>PS 160d type glass insulator</td>
<td>Pieces</td>
<td>175,3</td>
<td>17607</td>
<td>3086507,2</td>
<td>17607</td>
<td>3143907,7</td>
<td></td>
<td></td>
<td>+57400,5</td>
</tr>
<tr>
<td>13</td>
<td>Wire section of steel aluminum of type AS400 / 51</td>
<td>Ton</td>
<td>14755,0</td>
<td>3,395</td>
<td>50093,2</td>
<td>3,395</td>
<td>50941,6</td>
<td></td>
<td></td>
<td>+848,4</td>
</tr>
<tr>
<td>14</td>
<td>Other material costs</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>105415213,9</td>
<td>x</td>
<td>104539762,4</td>
<td>-875451,5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Total material costs</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>147952309,0</td>
<td>x</td>
<td>147872602,0</td>
<td>+79707,0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Analysis of labor costs for construction work performed under contracts with customers allows us to identify the factors that cause overhead costs by identifying and assessing the deviation of actual costs from the norm (or planned). Deviation of calculated labor costs for construction works occurs under the influence of the following factors:

- changes in the composition of construction work in terms of labor intensity;
- non-compliance with the qualifications of workers provided for in the estimate and regulatory framework (high assessment of the categories of workers in relation to the categories of work);
- low quality of construction materials and structures;
- low quality of work;
- non-compliance with the level of mechanization of work. In our opinion, in the analysis of the item of salary expenses, we consider it expedient to analyze the salary fund and its distribution by cost.

According to A.S. Akintoe and M.J. MacLeod, the distribution of the salary fund by cost items and the detection of deviations from the planned amount of actual expenditures allows determining the impact of changes in the salary fund on the cost [6].

A.N. Asaul, M.K. Starovoytov, R.A. Faltinsky note that the size of the salary fund in construction companies depends on the average salary and the number of employees [7]. We believe that the surplus (savings) of the salary fund due to an increase or decrease in the number of employees should be determined by the change in the planned average salary and the number of employees:

$$\Delta I_d = O_p \times (E_x - E_p)$$  \hspace{1cm} (9)

where, $\Delta I_d$ is the change in the salary fund;

- $O_p$ - planned average salary;
- $E_x$ - the number of actual cases;
- $E_p$ - the planned number of workers.

The surplus (savings) of the salary fund as a result of an increase (or decrease) in the level of the salary fund relative to the planned level should be determined on the basis of the following formula:

$$\Delta I_d = E_x \times (O_r - O_p)$$  \hspace{1cm} (10)

where, $O_r$ is actually the average wage.

In our opinion, the analysis of the salary fund allows us to identify the following areas:
- the absolute of the actual costs from the planned costs;
- indicators that determine the planned and actual amount of salary payments;
- quantitative assessment of the impact of deviations from the planned indicators;
- quantitative assessment of the impact of deviations from the planned indicators.

In our opinion, the factors that led to the overstatement (savings) of the salary fund within the construction organization, identified by the analysis, are:
- reconsideration of design solutions, deviations from normal construction conditions, replacement of materials, machines and mechanisms, manual labor, replacement of defective products, changes in work volumes and prices due to unforeseen work, additions, misapplication of prices;
- one-time orders to contractors, additional payments for salaries for weekends and holidays, changes in additional payments due to the payment of bonuses accrued for the implementation of the plan, additional payments from the collective fund, etc.;
- change of additional salary due to the time of execution of state duties; additional payments for team leadership, night work, overtime, and more.

MK-11 branch of JSC "Elektrkishloqqurilish" plans to build a new two-storey high-voltage 220 kV with the expansion of Yulduz substation to 2 cells at a distance of 98.4 km from Turakorgan district to Andijan. The number of employees is given in Table 4.

Table 4

<table>
<thead>
<tr>
<th>№</th>
<th>Work to be done</th>
<th>Number of employees</th>
<th>The difference (+,-)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Plan</td>
<td>%</td>
</tr>
<tr>
<td>1</td>
<td>Excavation of soil using excavators</td>
<td>13</td>
<td>3,05</td>
</tr>
<tr>
<td>2</td>
<td>Installation of prefabricated reinforced concrete section supports for spaced independent supports up to 2 m 3 in size</td>
<td>22</td>
<td>5,18</td>
</tr>
<tr>
<td>3</td>
<td>Reinforcement weighing up to 11 tons, installation of single-column intermediate steel supports</td>
<td>18</td>
<td>4,24</td>
</tr>
<tr>
<td>4</td>
<td>Waterproofing of prefabricated reinforced concrete foundations</td>
<td>19</td>
<td>4,48</td>
</tr>
<tr>
<td>5</td>
<td>Installation of an extended electrode device up to 10 m in length</td>
<td>20</td>
<td>4,7</td>
</tr>
</tbody>
</table>

9 Developed by the author as a result of research
The data in Table 4 show that 425 people actually participated in the construction and installation work performed by the MK-11 department of JSC "Elektrqishloqqurilish" according to the plan, and in fact 415 people. These data show that the average salary under the plan was \( \bar{O}_p = \frac{20377132.5 \times 425}{425} = 20377132.5 \) sums, while in reality it was \( \bar{O}_r = \frac{20675662.7 \times 415}{415} = 20675662.7 \) sums. On the basis of these data, it was found that the salary fund has actually saved more than planned in the construction and installation work performed by the MK-11 department of JSC "Elektrkishloqqurilish":

\[
\Delta I_d = 20377132.5 \times (415 - 425) = -203,771,325 \text{ sums}
\]

It was found that the actual reduction in the number of workers by 10 people compared to the plan in this construction and installation work led to an increase in the average salary per person by 298,530.2 sums and savings of 203,771,325 sums from the salary fund. The cost of maintenance and operation of construction machinery and equipment depends on the specifics of the construction work performed. In the context of the existing system of specialization in the construction industry, three organizational forms of use of construction machinery are used. This is because there are several forms of relations between the mechanization and construction and installation departments:

- the mechanization department carries out construction work as a subcontractor. In this case, the calculation is made for the current unit cost or the amount of work performed at aggregate prices;
- the machines are provided to construction companies for temporary work, with service personnel, and maintenance. Calculations for the operation of machines are made at estimated and planned prices (machine shift, machine operating hours, and other factors) and prices set per unit of work performed by the machine;
### Table 5

The structure of operating costs of machinery at the cost of construction and installation work performed by the department MK-11 of JSC "Elektrqishloqqurilish"\(^\text{10}\)

<table>
<thead>
<tr>
<th>Type of work</th>
<th>Working hours</th>
<th>Calculated for one hour (thousand sums)</th>
<th>Exploitation costs</th>
<th>The difference (-,+)&lt;br&gt;(thousand sums)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plan</td>
<td>Real</td>
<td>Plan</td>
<td>Real</td>
</tr>
<tr>
<td>1 Excavation of soil using excavators</td>
<td>7341,4</td>
<td>7454,4</td>
<td>180619</td>
<td>180619</td>
</tr>
<tr>
<td>2 Installation of prefabricated reinforced concrete section supports for intermediate independent supports up to 2 m(^3) in size</td>
<td>16012,6</td>
<td>16345,9</td>
<td>166534</td>
<td>166534</td>
</tr>
<tr>
<td>3 Reinforcement weighing up to 11 tons, installation of single-column intermediate steel supports</td>
<td>21675,2</td>
<td>21899,8</td>
<td>180619</td>
<td>180619</td>
</tr>
<tr>
<td>4 Waterproofing of prefabricated reinforced concrete foundations</td>
<td>13108,7</td>
<td>13254,3</td>
<td>145282,5</td>
<td>145282,5</td>
</tr>
<tr>
<td>5 Installation of an extended electrode device up to 10 m in length</td>
<td>2249,5</td>
<td>2420,1</td>
<td>116915</td>
<td>116915</td>
</tr>
<tr>
<td>6 Transport and installation of insulators</td>
<td>1315,3</td>
<td>1375,6</td>
<td>78023,2</td>
<td>78023,2</td>
</tr>
<tr>
<td>7 Trench and deep digging</td>
<td>16565,5</td>
<td>17883,9</td>
<td>83856,40</td>
<td>83856,40</td>
</tr>
<tr>
<td>8 Filling ditches and pits with soil</td>
<td>11987,7</td>
<td>12342,6</td>
<td>83856,40</td>
<td>83856,40</td>
</tr>
<tr>
<td>9 Other work done</td>
<td>27939,7</td>
<td>26976,0</td>
<td>145282,5</td>
<td>145282,5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>118195,6</strong></td>
<td><strong>119952,6</strong></td>
<td><strong>x</strong></td>
<td><strong>x</strong></td>
</tr>
</tbody>
</table>

\(^{10}\) Developed by the author as a result of research
- construction mechanization departments provide construction machinery and equipment on a lease basis. In this case, maintenance is performed by the organization, and other operating expenses are taken into account. Payment for rented construction machinery will be made at the approved planned and approximate estimates for each day of rent. When construction machinery is on the balance sheet of a construction organization, the operating costs of the machinery and equipment must be calculated by the organization.

We recommend that the analysis of operating costs of machines and mechanisms calculated for the volume of work completed by the mechanization department of the construction organization should be carried out in the following order:

\[ A = P_p \times Q_p; \quad A_r = P_r \times Q_r \]  \hspace{1cm} (11)

where, \( P_p, P_r \) - plan and actual volumes of mechanized work;
\( Q_p, Q_r \) is the planned and actually calculated price per unit of physical volume of mechanized work.

As a result of the changes, the actual costs and deviations from the plan should be determined as follows:

a) in terms of the actual volume of mechanized work
\[ A_p = P_r - P_p \]  \hspace{1cm} (12)
b) cost of workload according to plan and reality
\[ A_r = Q_r - Q_p \]  \hspace{1cm} (13)

In the cost of construction and installation work performed by the department MK-11 of JSC "Elektrqishloqqurilish" it was found that the operating costs of machinery actually exceeded the plan by 162602800 sums or 100.97%. In particular, the operating costs for excavation with the help of excavators actually exceeded the plan by 113 working hours or 20409947 sums, 333.3 hours or 55505782.2 sums for the installation of prefabricated reinforced concrete supports, 214 for the installation of single-column intermediate steel supports, 6 hours or 40567027.7 sums, 145.6 hours or 21153132 sums for waterproofing of prefabricated reinforced concrete foundations, 170.6 hours or 19945699 sums for installation of extended electrode device, 60.3 hours or 4704799 sums for transportation and installation of insulators, 1318.4 hours or 110556277.7 sums for trenching and deep digging, 354.9 hours or 29760636.4 sums for filling trenches and pits with soil, and 963.7 hours for other works. It was found that 14000051 sums were saved. It was found that the factor that led to the increase in operating costs compared to the plan was caused by the fact that the actual volume of mechanized work increased by 1737 hours compared to the plan. The average cost per unit of overtime work compared to the plan was 92545.7 sums.
Conclusion

In order not to increase the cost of construction works, the planned and actual costs of production and storage of materials in this area are 2% of the total cost of materials, 1.5% of the total cost of cable and wire products, 1.5% of the total cost of cable and wire products costs are 5% of the total cost of cable and wire products, and other costs are 24.27% of the total cost of materials, labor, machinery, storage, and preparation of materials, transportation, transportation of cable and wire products marked. This means that the actual cost of preparation and storage was 1,600,000 million sums less than planned, and the actual cost of materials was 79.7 million sums less than planned. The increase in transportation costs for cable and wire products by 59.4 million sums compared to the plan was since the cost of cable and wire products actually increased by 3,959 billion sums compared to the plan. As a result of these factors, the total transport costs actually exceeded the plan by 30.904 million sums. Other actual expenditures compared to the plan decreased by 91.44 million sums. Thus, the analysis of the cost of construction work performed based on contracts with customers, as recommended above, allows reducing the cost by obtaining accurate conclusions on the factors influencing the change in cost and their level of impact, with the correct organization of the analysis of each cost item.

References