

PAPER • OPEN ACCESS

Improvement of the material and production resources control in the construction industry

To cite this article: M Kh Saidova *et al* 2020 *IOP Conf. Ser.: Mater. Sci. Eng.* **919** 042001

View the [article online](#) for updates and enhancements.

You may also like

- [The main factors causing the outsourcing use in the construction organizations' activities](#)
E N Klochko, E A Britikova and L V Kovalenko
- [Marketing in construction. as a systematic approach to managing the activities of a construction organization](#)
T O Shlepneva and T A Maletina
- [Modeling the effect of using the innovative materials on the construction organizations economic performance](#)
N V Chepachenko, A A Leontiev, G A Uraev *et al.*

PRIME
PACIFIC RIM MEETING
ON ELECTROCHEMICAL
AND SOLID STATE SCIENCE

HONOLULU, HI
Oct 6–11, 2024

Abstract submission deadline:
April 12, 2024

Learn more and submit!

Joint Meeting of

The Electrochemical Society
•
The Electrochemical Society of Japan
•
Korea Electrochemical Society

Improvement of the material and production resources control in the construction industry

M Kh Saidova*, Sh I Xodjimuxamedova and M A Dadarbaev

Department of Accounting and Audit, Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, Tashkent, Republic of Uzbekistan

*E-mail: saidova-madina2010@mail.ru

Abstract. Ensuring effective and smooth functioning of construction organizations is impossible without the use in the activity inventory. The lack of effective operations management for the procurement and purchase of materials and accounts payable leads to errors that have a significant impact on execution of plans to completion of construction, the overstatement of the cost of new and previously rendered services, which in turn affect the profit and profitability of a construction company. Delays in delivery of materials leads to the violation of the rhythm of work of the organizations, downtime, requires additional labor costs, affects the quality of the products and degrades the technical-economic indicators of construction, in turn, the rhythm of delivery and accounts payable leads to the need for reform scope of work, failure to fulfil contractual obligations for its surrender, and economic sanctions. The purpose of this article is to study theoretical and methodological aspects of management of material - industrial stocks and their current state in construction organizations. On the basis of the studied materials, the findings for improving the system of control of inventories of construction organizations, including the introduction of modern inventory management systems, which are now very popular in the European market but not yet used by construction organizations of Uzbekistan. The subject of the study was inventory of construction organizations "PARKENTSUVQURILISH", which is a company with Russian capital. In this regard, the guidelines may be used both Uzbek and Russian organizations in the construction industry.

1. Introduction

Inventories are an important component in the activities of every organization. From the quality of management will depend on the efficiency of the production process as a whole. Under inventory understand the various material elements of production used as subjects of work in production process. They are entirely consumed, in each production cycle and completely transfer their value to the cost of production.

V. P. Astakhov believes that inventory in the broadest sense are the objects of labor, material, which form the basis of the manufactured product and included in the cost of services, works and production in the processing of a provisional nature, in one cycle of production [1].

According to A. D. Sheremet material-industrial stocks (MPZ) is a set of material property belonging to current assets, which include materials, work in process, finished products, goods [2].

N. A. Prodanova as inventory identifies the assets that are used, as subjects of work in production activities, the management of, or for purposes of sale, is entirely consumed in each production cycle and completely transfer its own value to the products manufactured [1].



Says E. A. Kulagina, stocks of industrial character are the various physical elements that are used as source items of work which are consumed in the production of products (performance of works, rendering services) or for managerial needs of nature [4].

The analysis of the above definitions showed that MPZ is a comprehensive category including: materials, goods, finished products and work in progress. Consider presented in the literature definitions of these notions (table 1.).

Table 1. The definition of "goods", "finished goods", "materials" according to different authors.

Author or source	the Definition of
Materials	
Kulagina E. L.	items are items of work that are intended for use in the manufacture of products and which are the material basis for the manufacture of products (performance of works)
Prodanova N. A.	the Materials consists of items of work, in other words, the property of spent in the main operating cycle of the company
Accounting dictionary Materials	a collective term that denotes all kinds of material components used in the first place, as objects of labor - raw materials, basic and auxiliary materials, fuel, energy, purchased products and semi-finished products, clothing, spare parts needed for repair and so on.
Astakhov, V. P.	Materials represent items of work that are designed for handling, processing or use in production or economic needs, means of labour, on the basis of, a particular order are part of the money in circulation, as well as operations associated with their procurement.
Finished products	
Sheremet A. D.	the Finished products are products and semi-finished, fully finished processing, corresponding to acting standards or specifications adopted at the warehouse or customer (buyer), as well as performed works and rendered services
Kulagina E. L.	the Finished products are products and semi-products, speakers-product of the production process with a fully-finished processing (equipment) to comply with current standards or the approved specifications accepted at the company warehouse or the customer
Dictionary of Finished goods	products completed in manufacturing and ready for sale or shipment to the customer, to be exported from the manufacturer
Products	
Prodanova N. A.	Goods are part of inventories are purchased or received from other organizations and citizens and is for sale
Sheremet A. D.	the Goods is part of the inventories of subsidiaries acquired or received from other organizations and citizens and is intended for sale or resale without additional processing
Accounting dictionary Products	through accounting, which is necessary for generalization of information on availability and movement of goods and materials are purchased as products for sale and hire

The analysis of the economic literature on the management of inventories shows that currently in the scientific community there remain controversial issues regarding the disclosure of the theoretical aspects of managing inventories of organizations and enterprises.

2. Methods

As the object of study, we chose the construction organization «PARKENTSUVQURILISH», which has been the leading trust of the water management complex of the Republic of Uzbekistan for almost 45 years. The Russian investment company «PROFINCOM! LLC made redemption payments in Uzbekistan, in connection with which this organization acquired the status of an enterprise with foreign

capital. Using the methods of economic analysis, statistics and monographic research, we have assessed the current state, dynamics of movement and the structure of the inventories of a construction organization.

According to table 2 for three years (2017-2019), the organization has an increase in inventories in the reporting year (2019) compared to the previous (2018) by 2140 thousand rubles.

Table 2. Analysis of the state of stocks of material resources "PARKENTSUVQURILISH" for 2017 – 2019.

Type of funds	Availability of funds, thousand rubles				Structure of funds, %			
	2017 year	2018 year	2019 year	Change (+;-)	2017 year	2018 year	2019 year	change (%)
Reserves total	866	506	2646	2140	100	100	100	-
Raw materials	721	204	1741	1537	83.3	40.3	65.8	25.5
Work in progress	85	214	523	309	9.8	42.3	19.8	-22.5
Deferred expenses	15	48	273	225	1.7	9.5	10.3	0.8
Other inventories and expenses	45	40	109	69	5.2	7.9	4.1	-3.8

Source: «PARKENTSUVQURILISH» Financial Statements.

This change occurred due to an increase in all articles, namely: raw materials and supplies for 2019 amounted to 1,741 thousand rubles, which is 1,537 thousand rubles. more than in 2018, it should be noted that in 2017 and in 2017 this article occupies the largest share in the structure of all stocks of the enterprise. Under the article, deferred expenses, an increase occurred by 255 thousand rubles. An increase is also observed in the line of work in progress by 309 thousand rubles. In 2019, the value of work in progress is 523 thousand rubles. Under the article, deferred expenses, an increase occurred by 255 thousand rubles. An increase is also observed in the line of work in progress by 309 thousand rubles. The structure also shows an increase in all indicators. For the analyzed period, the share of inventories in the composition of current assets increased to 66%, which indicates both an increase in the material consumption of production and an increase in inventories in order to reduce costs in case of price increases. An analysis of the dynamics of the stock structure allows us to conclude that the «PARKENTSUVQURILISH» stock structure is rational. To assess the structure of inventories, use the accumulation coefficient (table 3).

Table 3. The calculation of the coefficient of accumulation.

Stocks	Unit. rev.	Years		
		2017	2018	2019
Raw materials and materials	thousand rubles	721	204	1741
Costs of work in progress	thousand rubles	85	214	523
Other reserves and expenses	thousand rubles	45	40	109
Total: (line 1+ line 2+ line 3)	thousand rubles	851	458	2373
Deferred expenses	thousand rubles	15	48	273
Goods shipped	thousand rubles	0	0	0
Total:(line 5+ line 6)	thousand rubles	15	48	273

Accumulation factor (line 7 / line 4)	0.02	0.10	0.12
--	------	------	------

Source: PARKENTSUVQURILISH Financial Statements.

It is determined by the ratio of the total cost of raw materials and materials, work in progress, deferred expenses to the cost of finished products and goods shipped. The accumulation coefficient characterizes the level of mobility of inventories and, when optimally, it should be less than 1.

According to the enterprise balance sheet data presented in figure 4, the stock accumulation coefficient amounted to 0.02 in 2017, 0.10 in 2018, and 0.12 in 2019. Calculations show that the accumulation coefficient corresponds to the recommended value. This indicates a favorable stock structure of «PARKENTSUVQURILISH».

The next step in the analysis of inventories is the analysis of the availability of materials. The main condition for the smooth operation of the construction organization is the full security of the need for material resources with coverage sources.

An assessment was made of the security of the need for the delivery of material resources with contracts for their supply and their actual implementation (table 4).

Table 4. Satisfying the needs of material resources with contracts and their actual implementation in 2019.

Materials	Planned need, pcs	Sources of coverage needs pcs.		Concluded agreements, pcs.	Providing needs with contracts (Cob)%	Fastening saw from suppliers, pcs	Actual Security consumption nosti (Kob)%	Fulfillment of contracts,%
		Internal	External					
Metals	76	6	70	70	99.4	70	100.1	100.7
Zinc	14		1	13	89.	12	86.	96.6
Rebar fittings	92	27	65	60	94.6	63	98.3	105.7
Accumulative fittings	44		44	50	112.6	43	97.1	86.2
Rubber	226	33	180	193	100	188	100	100

Source: PARKENTSUVQURILISH Financial Statements.

Thus, the material requirements plan is not fully covered by supply contracts and internal sources of coverage. Underfulfillment of the actual delivery plan amounted to 0.33 percent. This says that only 99.67 percent is satisfied with the need for materials. The largest non-provision of demand for metals is 100.1%.

The analysis of the use of material resources. In the process of analyzing the use of material resources, first of all, they evaluate the correctness and validity of the plan, and then evaluate its implementation for such positions as: terms, volume, nomenclature.

In order to determine the economic feasibility of the planned need, compare the consumption rates per unit of production with the norms used in the process of calculating the plan of demand for these resources, as well as with the norms that are reflected in the planned costing. Determination of the need for supplies is made in accordance with the production program and on the basis of reasonable standards.

Thus, in «PARKENTSUVQURILISH» for the selected types of material resources, an unsatisfactory state of stocks is noted. Deviation from the maximum safety margin is more marked for metals and reinforcing bars.

Table 5. Analysis of the state of stocks of material resources "PARKENTSUVQURILISH".

Material pcs.	Average daily consumption, pcs. days	Actual stock	Stock rate, days	Deviation from the maximum norm
---------------	--------------------------------------	--------------	------------------	---------------------------------

		pcs.	days	maximum	minimum	days	pcs.
Metals	20	31	2	5	2	3	62
Rebar fittings	4	15	4	10	5	6	24
Accumulative fittings	25	73	29	20	16	-9	-22
Rubber	1	70	58	30	10	-28	-28

Source: PARKENTSUVQURILISH Financial Statements.

The last step is to analyze the effectiveness of the use of MPZ. The increase in the efficiency of use of material resources leads to a decrease in the cost of manufacturing products, a decrease in the cost of production and an increase in profit.

Inventory turnover shows how many times the organization used the average available inventory balance over the analyzed period. This indicator characterizes the quality of stocks and the effectiveness of their management, allows you to identify the remains of unused, obsolete or substandard stocks. The importance of the indicator is due to the fact that profit arises with each “turnover” of stocks (ie, use in production, the operating cycle).

The turnover ratio is calculated as the ratio of revenue from sales without VAT (in order to more correctly calculate the cost of sold products should be used) to the average size of inventories.

The analysis of the turnover of the refinery should also be carried out on the basis of cost. In this case, the coefficient is calculated as the ratio of the cost to the average value of the MPZ. The formula is as follows:

$$Oz = C / [(Znp + Zkp) / 2] \quad (1)$$

With - the cost of production sold in the billing period;

Znp and Zkp - the amount of stock balances MPZ at the beginning and end of the period. The inverse indicator is the treatment time in days. This indicator is calculated as follows:

$$Pos = (T \text{ lane}) / Oz \quad (2)$$

T lane - the duration of the period in days.

Table 6. Analysis of the turnover of the MPP “PARKENTSUVQURILISH” based on the proceeds from the sale of products.

Indicators	Unit rev	Years			of Change	
		2017	2018	2019	2018 from 2017	2019 from 2018
Revenue from the sale of	thousand rubles	80 147	85 726	97 266	5 579	11 540
Average annual refineries	thousand rubles	1023.5	736	1576	-288	840
Turnover period MPZ (p. 2 * 360 / p. 1)	days.	8.05	5.41	10.21	-3	5
MPZ turnover ratio (p. 1 / p. 2)		78.31	116.48	61.72	38	-55
Fixing ratio 1 / page 4		1023.5	736	1576	-288	840

Source: PARKENTSUVQURILISH Financial Statements.

The data in table 6 characterize the acceleration of inventory turnover. The shelf life of inventory items increased by 1 day in 2018 compared with 2017, and in 2019 compared with 2018 increased by 5 days and amounted to 10.21 days.

3. Results

On the basis of produced calculations will determine the financial cycle. The financial cycle represents the difference between the period of revolution of the inventory and accounts receivable period accounts payable outstanding. The calculation formula is as follows:

- where: TS – period of turnover of stocks of the enterprise;
- TDZ – period of turnover of receivables;
- TKZ – the turnover period of accounts payable;
- Goat – turnover ratio of stocks.
- Cox – turnover ratio of receivables;
- Kokz – turnover ratio of accounts payable [5].
- Using this formula define financial cycle "PARKENTSUVQURILISH" for 2018 and 2019
- $TF = 360/68 + 360/9,2 + 360/7,8 = 90,3$ (2018 year)
- $TF = 360/102 + 360/7,8 + 360/8,4 = 92,5$ (2019 year)

From calculations it can be seen that the financial cycle "PARKENTSUVQURILISH" in 2019 increased by 2.5 days. But in General it corresponds to the timing of accounts receivable and accounts payable (90 days).

The increase in the duration of the financial cycle has a negative impact on the financial strength of the construction organization. Leads to a decrease in solvency and liquidity.

The main purpose of any inventory is the determination of the optimal value finite remnant inventory. The pursuit of this led to the establishment of inventory management systems. The creation and improvement of inventory management systems is a consequence of problems in the warehouse activities. Therefore, a system has arisen to prevent the formation of excess inventory levels of finished products, which can lead to excessive immobilization of the organization's funds and additional storage costs; to ensure the normal rhythm of production and financial cycle.

Construction organizations of water management, characterized by seasonal features of construction and storage of construction materials, which should be considered when choosing the inventory control system.

4. Discussion

System of inventory management relate to logistics. Being a logistics approach to management of material flows is the integration of separate participants of the logistics process in a single system that can quickly and economically deliver the required goods to the right place. The difficulty here is that within a single logistics system it is necessary to combine different owners, i.e. entities with different economic interests.

Consider the concept of a logistic system of the organization of home building materials to the objects. The marketing Department focuses and processes information about the needs of the construction of objects in various materials, information about production capacities of the organizations. The Department should develop daily delivery schedules of the production of goods with the indication of the provider and recipient of every detail. Reduces the need for people, technology, and Finance. Accordingly, the companies that produce such construction products should apply the inventory management system, which will allow to produce products exactly to the time it is needed by the customer. This will reduce the warehouse space not only contractor, but also at the enterprise. The result of the operation of the system is the right product, in right quantity, right quality, right time, right place with minimum cost.

The use of a control system of material-industrial stocks "just-in-time" (Just-in-time, JIT). The original motto of this system was the possible exclusion of inventories in the production process. The essence of this system is that if the production plan is set, to establish the movement of inventory so that all resources, materials and semi-finished products will be received in the required amount in required place and by a certain date assigned for the production or Assembly of finished products. The reserves,

and, consequently, warehouses are not needed, and the materials should arrive as and when necessary, the production in them [6].

Under this program, the last in the production chain unit (for example, Assembly shop) has received an order for the production of a certain number of finished products. This unit sends the order to the previous components in the supply chain unit and receives within the specified period of the desired components in a predetermined amount. If divisions are many, the ordering process is repeated until the generated order for finished goods to an external vendor.

5. Conclusions

As a result of the implementation of one of the above inventory management systems in PARKENTSUVQURILISH, the following results can be achieved:

- the duration of the production cycle will decrease by 10%, which will make it possible to increase the volume of products and revenue from its sale;
- production costs will decrease by 5%, which will lead to an increase in net profit, respectively, and profitability of production;
- significantly increase the flexibility of production;
- the time of delivery of objects will be reduced by 2 times;
- optimized inventory turnover ratio.

Next, we calculate the economic effect of the implemented measures. To calculate the economic efficiency of the implementation of the inventory management system, we define the annual budget allocated to their implementation.

In total, the program for the development, implementation, training of company employees, certification is designed for 36 academic hours. The cost of the course, taking into account the cost of lunch and guidelines is 8450 rubles. The calculated data are entered in table 7.

Table 7. The amount of training costs for the personnel of PARKENTSUVQURILISH in the inventory management system.

Personnel	Number of students, people	Cost of the course	Amount of expenses, rub
Leaders	4	6730	26920
Specialists Including	9		
- quality service	2	6730	13460
- developers documentation	3	6730	20190
- internal audit experts	4	6730	26920
Workers	25	6730	168250
Total:	38	6730	255740

The table shows that the cost of training personnel will be 255740 rubles. Given the positive financial condition of PARKENTSUVQURILISH, we can say that the organization will be able to recoup these costs in a short time.

References

- [1] Astakhov V P 2016 *Accounting (financial) accounting in 2 hours I Textbook for academic undergraduate* (Lyubertsy: Yurayt) p 536
- [2] Sheremet A D and Starovoitova E V 2020 *Accounting and analysis: textbook 3rd ed Revised.* and add. / under total. ed. prof. HELL. Sheremet. (Moscow: INFRA-M) p 472

- [3] Prodanova N A, Lizyaeva V V, Zatsarinnaya E I and Krotova E A 2019 *Accounting at small businesses: a textbook for academic undergraduate* (M.: Publishers) p 275
- [4] Kulyakina E L and Dubenko A Yu 2016 Disclosure of the methodology for the implementation of internal control of operations with refineries, as the basis for effective management of the organization's working capital *Science and education: preserving the past, creating the future: a collection of articles of the VIth international scientific -practical conference* (Penza: Science and Enlightenment) p 165-8
- [5] Jene Siciliano 2005 *Finance for Non-Financial Managers* (Publisher: GrossMedia) p 256
- [6] Anikin B A and Rudaya I L 2019 *Outsourcing and outstaffing: high technology management* (Moscow: INFRA-M) p 330