PLANNING OF TRANSPORT ACTIVITY BASED ON CONTINUOUS IMPROVEMENT OF BUSINESS

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ABSTRACT

The main objectives of planning in transport organizations are complete and timely satisfaction of customer needs in transportation, reduction of delivery terms, enhancing the quality of transport services, as well as improving transport links between economic regions of the country. To do this it is offered to include methods of continuous improvement of business and reduction of losses in planning processes.

Keywords: economy, railway, business planning, minimization of losses, value of processes.

Background. *Sectoral planning, focused on improving efficiency and competitiveness of organizations, should be considered first and foremost under an angle of matching socio-economic and strategic objectives of transport.*

Obviously, the creation of management models ensuring achievement of results desired for the Russian railways (level of profitability, profits, sales volumes), determines a need to change tools, supporting processes of strategic and current planning [1, 2].

In an increasing competition with other modes of transport JSC «Russian Railways» seeks not to lose perspective markets, to make the most of their resources to optimize all aspects of transportation activity. An effective tool for achieving strategic goals of the holding may be, in particular, application of a systematic approach, lean production techniques. Confirmation of this we find in the works devoted to evaluation of experience and effectiveness of implemented projects to reduce losses on transport [3, 4, 10].

Objective. *The objective of the author is to investigate ways for planning of transport activity based on continuous improvement of business.*

Methods. *The author uses general scientific methods, economic evaluation, comparative method.*

Results. *As a result of author's developments and analysis of conceptual content [5, 6] as well as experience in applying a concept of lean production in the largest organization of transport [7, 8], I proposed a following formulation of the essence of such an approach to improve business: «The concept of lean production is a set of tools to identify losses affecting the planned performance of transport organizations».*

I refer to lean production tools a set of methods (methods, algorithms, technology) designed to influence the effectiveness of the organization in planning its actions to eliminate losses (change in the nature of activities, attraction of required resources) in order to achieve compliance with customer expectations.

In the analysis of theoretical approaches [9] and existing processes of transport companies in the first positions there are two planning methods:

• planning «from scratch» – it is based on the analysis and the formation of standards. By analyzing the specifications of materials and equipment, the timing of operations scientifically based standards for the cost of each process are established;

• planning «from achieved» – it is based on statistical data of past periods. In this case, the planned measures may take into account losses and inefficiency at the previous stage of activities.

Based on these characteristics, it can be concluded that none of planning methods takes into account the results of the projects of lean production, projects to improve business practices and innovations.

It is important to note that in 2014 the number of units involved in the program of projects increased to 1613, employees of the holding offered 4195 improvements, 3591 processes were revised. Due to implementation of

projects economic benefit over 1040 million rubles was received [11]. It turns out, however, that production and economic benefits are of one-time nature and are not taken into account in the planning of future maintenance costs.

To reflect the interrelation of planning of indicators and identification of losses I have hypothesized coherence cycles, whereby improving operational processes of the transport company on the basis of loss detection is proposed to be considered as a mandatory part of the planning cycle of organization activity.

It should be noted that the planning cycle of organization activity and the cycle of identifying losses have an intersection, which is reflected in the operations carried out at the planning stage of the organization activity and at the stage of analysis of the implementation of the planned indicators.

• Given the author's studies were formed basic elements of the planning process of transport organization's parameters, which include a cycle of losses detection (Pic. 1):

• planning of works to identify losses in the processes at all levels and planning of indicators of the transport organization with account of elimination of identified losses;

• implementation of operational processes and measurement of their performance;

• monitoring actual performance deviations from planned values of processes performance and identification of priority areas for improving operational activity of transport organization;

• Development and implementation of measures to reduce operations that do not add value to the client.

To establish the dependence of the change in planned indicators from identified losses a resource approach to adjusting them with the use of a coefficient of reduction of losses is proposed. This approach is close to its meaning in the works of both domestic and foreign scholars in the field of lean production and the determination of the value stream [12, 14, 15].

Resources of railway transport can be divided into two categories: internal – main lines, dispatch control system, locomotives, cars, communications equipment, etc .; external – own tracks of enterprises, customers, local government, etc. [13].

From a planning perspective the author proposes to consider as the basic resources used in the processes of the transport company:

• workforce, measured by labor intensity (man-hours);

• the level of assets use in terms of performance or other physical indicators of efficiency of use;

• material costs (fuel, electricity, materials, spare parts, tools, etc.).

The coefficient of reduction of losses (C_l) in the planned indicator is proposed to be determined by the proposed formula:

$$C_l = \alpha_{li} \cdot R_{li} + \alpha_a \cdot R_a + \alpha_m \cdot R_m \qquad (1)$$

where α_{li} is a proportion of the influence of loss

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Table 1

The nomenclature of losses

№	Group of losses	Labor resources	Assets (fixed assets)	Materials (current assets)
		Changes in resource indicators		
1	Idle hours and delays	• Loss of working time. • Reduced productivity. • Decrease of service performance per employee.	• Downtime of railway infrastructure. • Downtime of cars. • Downtime of locomotives.	• Formation of over normative inventories of materials. • Aging and deterioration of materials.
2	Surplus stocks of materials	• Increase in the number of employees (staff responsible for storage of materials).	Exessive storage space	Formation of excessive stocks of materials.
3	Excess transportation of subjects of labor	• Increase in complexity of the process. • Increase in working time spent on the production of services. • Reduced productivity.	• Movement of empty cars • Delivery of repair equipment to infrastructure facilities • Unsustainable economic and shunting movement.	Increased cost of materials due to the transport component.
4	Errors and malfunctions	• Loss of working time associated with rework. • Increasing in working time spent on the production of services. • Reduced productivity.	• Re-use of infrastructure. • Re-use rolling stock.	Repeated material costs during rework.
5	Unnecessary actions and operations	• Increasing labor intensity of the process. • Loss of working time spent on unnecessary activities. • Reduced productivity. • Increase in the number of employees.	• Deterioration of the infrastructure due to excessive movement. • Deterioration of rolling stock due to excessive movement. • Traffic restrictions on infrastructure due to unnecessary repair and diagnostic work.	Consumption of materials for operations, without which you can do without.
6	Unnecessary movement of workers	• Increasing the working time spent on the production of services. • Loss of working time spent on unnecessary movement. • Reduced productivity. • Increasing labor intensity of the process.	Irrational use and downtime of infrastructure and rolling stock.	Losses and damage of materials when moving employees.
7	Uneven processes	• Increasing labor intensity of the process at peak load. • Reduced productivity. • Loss of working time at low load.		Formation of excessive stocks of materials because of the complexity of planning.

reduction of labor intensity of the process on the planned indicator;

α_a is a proportion of the impact of reducing losses in the utilization of assets in terms of performance or other physical indicators of efficiency of use on the planned indicator;

α_m is a proportion of the impact of reducing losses of material costs on the planned indicator.

Ratio of influence on the index is determined in accordance with the nomenclature of losses (Table 1), in which various groups of losses correlate with change in resources consumed, and in accordance with the following rule:

1. If with this group of losses one resource index is associated, then α on this indicator = 1;

2. If with this group of losses two resource indicators are associated, then α for each of them = 0,5;

3. If with this group of losses three resource indicators are associated, then α for each resource indicator = 0,33.

In formula (1) symbols R_l, R_a and R_m are coefficients

of loss reduction of resources are proposed to be determined by the formula:

$$R = \frac{resource\ indicator\ without\ losses}{actual\ value\ of\ resource\ indicator}. \qquad (2)$$

Exceptions are resource indicators of the assets use, which target trend was growth in values of the level of the asset use: performance of a locomotive, useful life of technical equipment, etc. For them, the formula (2) takes a form of an inverse relationship:

$$R = \frac{actual\ value\ of\ resource\ indicator's\ use}{resource\ indicators'\ use\ without\ losses}. \qquad (3)$$

The planned value of the indicator of activity in the elimination of losses is proposed to be determined by the formula:

$$P_{pl} = P_{act} \cdot C_r. \qquad (4)$$

The use of this formula gives reliable results while maintaining the volume of performed works, transportation, services. If the volume of work at the station, landfill, in the structural unit substantially increases, it is necessary
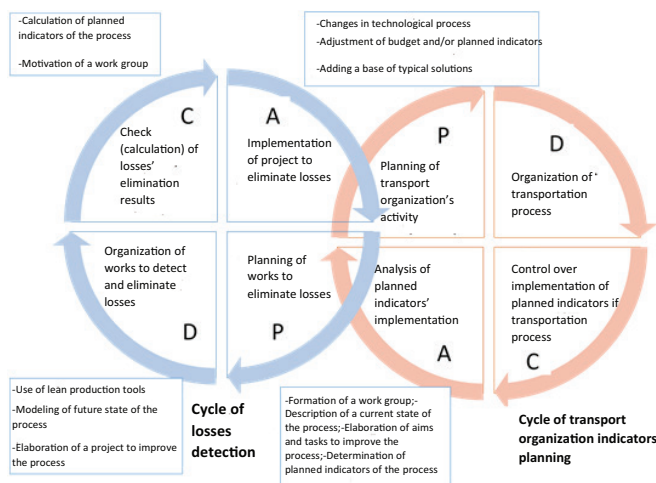
Pic. 1. The interdependence between processes of indicators' planning and detection of losses.

to divide in the indicator conditionally constant and variable parts. In this case, the planned value is calculated by the formula:

$$P_{pl} = P_{act} * \left(\gamma_{var} * \frac{Q^{'}}{Q} + \gamma_{cc} \right) * C_I \qquad (5)$$

In an analysis of planned values for all business units it is proposed to include separation of activities, processes and operations of transport company based on the determination of the impact of certain aspects of the activity, individual units and individual performers on its general results, the ability to add value to consumers of products, both consignors and consignees.

Conclusions. The proposed approach allows for improving the coherence of cycles of business processes improvement by identifying losses and planning cycle of the organization's activity. Its advantage is the possibility of leveling the presence of losses during past periods of activity and associated actual values when planning future indicators.

The use of all methods of analysis of planned and budget indicators of the activity of JSC «Russian Railways», along with similar tools of lean production gives you the opportunity to identify and reduce losses of all kinds in the operating activity, to ensure efficiency and competitiveness of transport holding.

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