DETERMINATION OF THE FEATURES AND BASIC PRINCIPLES OF FINANCE OF RAILWAY TRANSPORT IN CONDITIONS OF ENERGY CONSERVATION

1. Introduction

The role of railway transport in social production is unquestionably significant. The unique role of cargo transportation as such is that transportation itself is one of the most important elements of the production process of all production without exception. Since until a certain product is delivered to the consumer, it is not completely, so to speak, manufactured and can’t be used by the consumer [1]. Among other types of transport, rail transport distinguishes, first of all, its versatility, which lies in the fact that it is the railway that is able to provide transportation of any cargo at any distance. An important role in the work of railway transport is played by its finances, without which the work of enterprises is impossible, especially in conditions of using energy-saving technologies.

«Railway transport is a production and technological complex of railway transport enterprises designed to meet the needs of public production and the country’s population in transportation in domestic and international traffic and to provide other transport services to all consumers without restrictions on the basis of ownership and types of activities, etc.» [2]. On the example of railway transport in Ukraine, let’s consider an analysis of the financing of railway transport. 100 % of the shares of the joint-stock company (JSC) Ukrzaliznytsia are owned by the state of Ukraine. According to the law of Ukraine [3], railways and state enterprises that are subordinate to the management of the central executive authority are included in the railway transport enterprise (RTE), which in turn ensures the formation and implementation of state policy in the transport sector. Institutions and organizations of public railway transport include healthcare institutions, educational institutions that belong to the sphere of administration of the central executive authority. These institutions provide the formation and implementation state policy in the field of transport. Also included are higher education institutions of the 1st level of accreditation, which provide training for specialists in railway transport.
Analysis of the organization of finance of railway enterprises is an urgent issue, the solution of which is the subject of research.

2. The object of research and its technological audit

The object of research is the finance of the railway industry in terms of energy conservation.

To determine the essence of the financial management of the railway transport enterprise (RTE), the task is to characterize the features of the functioning of the finance of the railway enterprise, to determine how to most fully use them, taking into account the conditions of energy conservation for the purpose of efficient management. However, an analysis of the theoretical foundations of the concept of «finance» indicates a divergence of opinions of scientists about its interpretation. These disagreements give rise in practice to a number of problems associated with the choice of methods for managing them.

3. The aim and objectives of research

The aim of research is to determine the features and basic principles of finance based on the analysis of their management at the railway transport enterprises in conditions of energy conservation. To solve the aim, the following research objectives were set:

1. To determine the principles of organization of RTE finance.
2. To analyze the RTE financial management in the energy saving mode.
3. To determine the specifics of financial relations in rail transport.

4. Research of existing solutions of the problem

Based on the study of the effectiveness of managing financial resources of enterprises using the example of enterprises in the railway industry, financial resources were determined in [4] as cash income and savings held by enterprises, organizations and the state. And financial resources are intended to fulfill obligations to the financial and credit system, to provide material incentives for employees and incur expenses for expanded production reproduction.

Let’s determine that under the RTE finances it is possible to understand the system of monetary relations of the specified economic entity, that is, the totality of payments, receipts, distribution and use of funds in the process of its production and economic activity.

Financial management of a transport company takes place according to certain principles. A study of the scientific literature on this issue showed that scientists and business executives, because the principles themselves are constantly in a state of development and improvement, have not come to a consensus on their clear presentation. Therefore, it makes sense to analyze the specific basic principles of financial management in relation to the railway industry. At the present stage of economic development, scientists and business executives [5] relate the following to the basic principles of organizing the RTE finance:

- full independence, self-sufficiency, financial planning [6, 7];
- mandatory provisioning;
- observance of financial discipline, material interest of the collective, material liability of the enterprise, control over financial and economic activities [8] of enterprises, organizations and institutions of railway transport.

These principles are described in Table 1.

### Table 1

| No. | Principle name | Essential interpretation of the principle |
|-----|----------------|-----------------------------------------|
| 1   | Full independence | Independence in the use of own and equivalent means |
| 2   | Self-sufficiency  | The financial activities of enterprises, organizations and institutions of the railway industry are based on such an investment of funds, which must be paid off, that is, a stable circulation of financial resources is ensured |
| 3   | Financial planning | It consists in a preliminary determination of the directions: — the movement of cash flows in the near future and in the long term; — receipt of cash; — further use of the funds received. |
| 4   | Mandatory reserves | Formation of financial reserves in order to ensure sustainable production activities in the context of energy conservation, especially in the transition period to the RTE energy-saving operating mode, possible fluctuations in the market, certain risks, etc. |
| 5   | Financial discipline | Public-use RTEs must timely and fully ensure the fulfillment of financial obligations to partners, banking institutions, authorities, various budgetary or extra-budgetary funds, as well as to their employees, etc. |
| 6   | The material interest of the team | Encouraging RTE to continuously increase production efficiency through a system of wages and profit distribution to the site, which is intended to encourage the enterprise team by forming economic incentive funds, bonus payments based on the results of the competition, etc. |
| 7   | Company liability | Liability for violation of the requirements of the Charter of Railways of Ukraine, for failure to comply with the transportation plan, for the presence of defects in operational work through fines, penalties, forfeits, sale of products below the level of planned prices, etc. |
| 8   | Monitoring the financial and economic activities of enterprises, organizations and institutions | The mechanism of economic management is necessarily regulated by the law of economic development in a market and the law of value |

Note: * built on the basis of [5–8]
mandatory requirement of efficiency, since the creation and operation of some RTE financial management system in energy saving mode inevitably implies the presence of costs. Therefore, the management system itself should be economically feasible in the sense that direct costs are justified by direct or indirect income. In addition, it is not always possible in practice to fully comply with the plan due to the occurrence of force majeure situations in production, so the planning system, and hence financial management, should be quite flexible and take into account the possibility of dynamic transformations over time. The current economic situation of the RTE also does not always contribute to compliance with the principle of financial planning, for the reason that the formation of new planning systems, including in an energy-saving mode, depends on objective contradictory factors affecting the level of planned work. On the one hand, this is, firstly, the difficult financial condition of most of the country’s transport companies, and secondly, due to the outflow of young people and qualified personnel abroad, there is a tendency to reduce staff qualifications. Thirdly, often insufficient computer literacy of employees; fourthly, ineffective motivation systems are guaranteed to cause a negative impact on planning. On the other hand, there are such effective factors as the interest of the RTE management, the innovativeness and creativity of the RTE working staff, effective marketing activities that positively affect this process. Therefore, all the above factors should be taken into account in modern market conditions for the RTE existence for the successful implementation of the principle of financial planning.

The importance of financial management issues for the modern economy of the state is evidenced by the fact that quite a lot of work by scientists and practitioners is devoted to studying the essence of such definitions as «financial management of an enterprise» and «financial management of a transport enterprise» [10, 11].

Among the main directions of solving this problem of financial management, identified in the resources of the world scientific periodicals, it is possible to single out [12], but in this work let’s consider only the management method for using the causality principle in the field of expenses. In this work, the main characteristics and suggestions for using the principle of causality and control only at the enterprises of automobile transport are given.

The work [13] is devoted to the analysis of the development of the transnational European railway system, which is today within the European Union. Cases based on the development of railway networks from local sectoral lines to small trans-regional networks initiated by the private sector are described. It is noted that the importance of railway networks in the political agenda has changed over time and has affected the financing of railway projects. However, there is an unresolved issue of financial management for energy conservation within the RTE for the conditions of the European Union.

The authors of [14] analyze the capital structure of the main Spanish RTEs over the course of private operating years. From this analysis, it is possible to get an idea of the investments, financing and return of these companies, which account for about 75% of the sector. However, in this work, the level of influence of energy-saving technologies on changes in financial management is not fully disclosed.

RTE facilities have the ability to manage their finances within the limits established by the state. So, the more efficiently the financial management of an enterprise is carried out, the more successfully it works under other similar conditions, the more it is financially stable and has a competitive state in the consumer market of transport services.

Thus, the results of the analysis allow to conclude that there is virtually no research in the management of RTE finances in the context of energy conservation, both for railways that are under full or partial government leadership, and for private RTE facilities.

5. Methods of research

During the execution of the work, general scientific and special research methods were applied:

- a method of analyzing the principles of organizing the finance of transport industry enterprises to determine the possibilities for improving management efficiency in the context of energy conservation;
- a method of generalization in the analysis of RTE financial management;
- a method of analytical analysis to create a dynamic model of financial equilibrium, which makes it possible to determine and fix the stability of RTE financial condition.

6. Research results

The energy saving mode at RTE generates a serious controversy over financial management, which in turn arises for objective reasons. Given the urgent need for the functioning and development of a transport enterprise in the context of energy conservation, any qualitative changes primarily relate to the technical and technological component of its production system. The transition to new business conditions does not occur instantly, but requires a certain amount of time and cost, quite tangible in a financial sense. Such a transition period to the RTE disruption in the normal mode, manifested by a decrease in the company’s revenue. However, the continuation of work in the usual old mode gradually reduces the current efficiency of the enterprise and makes impossible the future performance.

Regarding the solution of such a «technological gap», it is noted in [15] that when an enterprise is faced with the need to resolve the above contradiction, it actually loses the ability to maintain its dynamic stability in a strategic perspective. One of the ways to eliminate the contradictions between current and strategic efficiency, the researcher considers dynamic modeling of financial equilibrium, the determining factor of which is the need to find a reasonably favorable relationship between the levels of static and dynamic stability of the enterprise. Moreover, financial equilibrium depends on a certain number of indicators that determine the stability of the financial condition of the enterprise, as well as satisfactory values of profitability and risk indicators for a certain RTE.

Thus, to create a dynamic model of the RTE financial equilibrium under conditions of energy conservation, it becomes necessary to study and analyze the current financial condition of the enterprise. The dynamic model allows to determine and fix the stability of its financial condition for a specific date, that is, to perform a time slice of static stability, to calculate changes in interval
performance indicators for a specific period of time. Such measures should ensure that the proportions between the cash flow parameters are taken into account; they change during the implementation of the energy saving regime and factor indicators of the financial stability of the enterprise. Of strategic importance is the general positive trend of the cash flow generated over the studied interval, and the reasons for the changes in its elements, as well as the magnitude of the proportional change in the flow elements among themselves [16]. The economic feasibility of modeling requires the observance of the advantages of stability over dynamism, control and prediction of managerial decisions made over freedom, programmed behavior for unprogrammed things like that. However, for the future success of managing under the conditions of RTE energy saving in the future, it needs qualitative changes, at some time periods it does not agree with the equilibrium parameters of the RTE operation. Therefore, to ensure the effectiveness of development in the new conditions for the functioning of the enterprise, it is necessary to resolve this contradiction through the consistent achievement of a certain financial equilibrium.

According to financial equilibrium, according to the principle of R. Bellman, optimal management has such a property that no matter what the initial state and initial management are, further management should be optimal about the state obtained as a result of the implementation of initial management decisions [17].

In the process of implementation and at the beginning of the implementation of the RTE energy saving mode, it is necessary to ensure the dynamic financial stability of the enterprise. Therefore, to determine the appropriateness of certain changes and the need to apply the selected technologies and energy conservation measures, it is proposed to use the so-called matrix of the choice of financial strategy of Franchon and Romanet [18]. The matrix covers options for correlating the results of RTE economic activities in the usual stable period of management, planned volumes and directions of cash flows when restrictions are imposed due to energy saving conditions and sources of resource support. The indicators above the matrix can be used as the basis for the development of an optimal financial management system for the railway industry based on key financial criteria and performance indicators in the context of energy conservation. Using the matrix of financial strategies allows not only to evaluate the floated financial management on the overall performance of the RTE, but also to justify the following steps. Regarding to timely adjust the financial management strategy taking into account the guaranteed changes in the financial condition of the transport company.

Analysis of scientific publications [19–21] shows that the financial management of any enterprise is determined by its industry affiliation. In turn, the specifics of finance of railway transport is based on the characteristics of its economy, organization of production and management, due to the business process.

Therefore, railway transport as a branch of the economy has its own characteristics and specifies that distinguish it from other industrial sectors, namely:

- products of railway transport do not have a material form, that is, this transport does not produce a new product, but only moves goods or products created in other sectors of the economy;
- subject of its labor does not belong to railway transport, that is, the goods or passengers to be transported; since the goods belong to the senders or recipients of the latter;
- pricing for rail services is based on tariffs for freight and passenger transportation;
- units of measurement of transport products are:
  1) ton-kilometers (cargo turnover – the sum of the products of the amount of cargo transported in tons to the length of track sections in kilometers);
  2) passenger-kilometers (passenger turnover – the sum of the products of the number of passengers sent at the distance they follow);
  3) cargo tones (the number of loaded, unloaded and shipped tons of cargo) and the number of passengers sent;
- products of the railway transport can’t be accumulated or prepared in advance, saved for the future, etc., therefore, the industry can’t work without a reserve of locomotives and wagons, and also without taking into account the capacity in the iron race;
- railway transport does not create and does not add anything tangible to the goods;
- composition of the expenses of the railway industry does not contain the cost of the raw materials from which the goods are produced, while the fate of its cost is sometimes very significant at industrial enterprises;
- activities of the railway company are subject to or subject to seasonality, the so-called seasonal «peaks», which is characterized by uneven use of vehicles during the year.

The main stages of the production process on the railway are:

1) loading goods into rolling stock or boarding passengers;
2) movement of goods and passengers between points of departure and destination;
3) unloading of goods from rolling stock disembarking passengers at their destination.

Each of these stages of the transport process, in turn, consists of a number of operations carried out during the preparation, organization and implementation of transport. So, cargo loading includes a large number of works and costs for preparing the goods for dispatch, such as:

- sorting of cargo by recipients and directions, load in rolling stock;
- registration of transport documentation;
- consolidation, coordination, weighing or counting, if the goods are piece and the like.

To move the cargo, the type of rolling stock is selected, the route of movement is determined, the traffic safety and cargo safety are ensured, vehicles are refueled with fuels and lubricants on the way; the movement of the rolling stock is observed and the traffic schedule is observed.

Unloading cargo includes operations such as:

- familiarization of the consignee with the shipping documents and determination of compliance of their contents with the existing cargo;
- weighing or recounting of cargo;
- identification of damage or loss of cargo; preparation for unloading and directly unloading.

The efficiency of the production process on the railway, its continuity, largely depends on the consistency and duration of each of the above stages of the transport process in time. During transportation, the stages of the transport process for each unit of rolling stock are constantly repeated. Therefore, the above fact determines the
cyclical nature of the transport process. The duration of the cycle consists of the time taken to complete all stages of the transport process and the elements of which these stages consist. Reducing the duration of this cycle is one of the factors for the growth of labor productivity in rail transport and the reduction in the cost of transportation.

Thus, through the growing demand for the transport of goods and passengers, given the seasonal cyclical nature of these transportations, the railway company is faced with the task of planning the appropriate transportation reserves in the form of a railway carrying capacity resource. The need for accelerated development of railway transport links is due not only to seasonal peaks in traffic. Unlike other sectors of the economy, the construction of new and the development of existing railways is associated with the following components:

- fairly long periods of scientific and engineering research;
- long-term design;
- creation of appropriate industrial and construction facilities and the preparation of material and financial funds;
- finding stable sources of financing.

Railways are the main link in the transport system of the Ukrainian national economy. Now the company JSC «Ukrzaliznytsia» provides 82% of freight and about 50% of passenger traffic carried out by all modes of transport existing in the state. In terms of freight traffic, the Ukrainian railway ranks fourth on the Eurasian continent, second only to the railways of China, Russia and India [22]. For this reason, reliable operation of the railway industry enterprises is a necessary condition for maintaining a single economic space and the integrity of the state of Ukraine, a guarantee of economic reforms, and creating the possibility of expanding international economic ties.

Based on the above study, the finances of the railway transport company is a system of economic relations arising in real money circulation regarding the formation, distribution and use of financial resources. The finances of the railway transport enterprise ensure the functioning of this enterprise and the fulfillment of tasks arising in the process of production and economic activity.

The financial resources of the railway transport enterprises include the totality of their own cash income and income from outside, designed to fulfill financial obligations, finance current costs and expenses associated with the development of this production.

RTE finances perform the following functions:
1) formation of various forms of cash income and savings in the process of production and economic activity;
2) implementation of the distribution of income and funds for the development and reproduction of the economy; material incentives for workers, the formation of budget revenues;
3) control over all parties to the economic activity of the transport company and the like.

The forming function of finance is carried out for the fact that the railway transport enterprises at the established tariffs and prices realize: transportation of goods, passengers, baggage, mail, various construction and handling operations, production and public services. In addition, railway transport enterprises are engaged in so-called non-core activities, such as advertising on rail transport, telecommunications services, and the like. From the sale of products at railway enterprises, cash funds are created in the form of income and profits, thereby creating the conditions for finance to perform its distribution and control function.

The distribution function of finance in the railway industry ensures the centralization of resources at the level of the joint-stock company Ukrainian Railways and their redistribution within railway transport, as well as between transport and budgets. With the help of this function, the cost of consumed means of production and income generation in various forms is compensated, and special-purpose funds are formed that are necessary to meet the needs and development of production, as well as material incentives for workers. Let's note that the strengthening of the financial impact of the productivity of railway enterprises on the country’s economy requires constant improvement of the distribution mechanism of finance.

The control function of the railway industry allows to control the movement of financial resources. Also, the control function ensures the distribution and use of the cash fund when paying wages, transferring a single social contribution, paying the cost of materials, fuel, electricity and other mandatory payments. It monitors the services and costs associated with the process of production and sale of «products». Financial indicators make it possible to see the various aspects of the work of a railway enterprise in conditions of energy conservation and evaluate the results of economic activity. Let’s note that the control function does not act in isolation, but in close unity with the distribution.

The specifics of financial relations in rail transport:
1. Currently, railway transport is one of the few sectors of the economy, not only almost completely financing itself, but also one of the largest donors of the country’s budget.
2. Rail transport cross-subsidizes passenger and suburban transportation, while regional budgets are not always able to cover the losses of the railway from suburban transportation.
3. Railway transport operates at state-regulated tariffs, despite the fact that prices for products of other industries, including competitive ones, have become free.
4. A number of railways and their branches, as well as a significant number of stations, locomotive and car depots, races and other structural units, can take part, and, as a rule, take part in each transportation. This leads to the existence of a special system of payments for transportation between them.
5. The railway landfill may occupy the territory of several regions having different business conditions.

The railway landfill is a part of the railway network, which is characterized by common technical or technological features that determine the operating conditions of the railways. There are landfills: according to the standards of lengths of receiving and sending station tracks (for example, 850 m, 1050 m), the type of long-haul and heavy trains; application of multiple traction; electrified lines and stuff. Separation of the railway network into landfills is also used in technical and economic or technical calculations, and the conduct of technical and technological experiments. The railway training ground is selected in such a way that it is possible to provide a comparison of the calculations according to the empirical options.

7. SWOT analysis of research results

Strengths. The strengths are that in the course of the work the content of such concepts as «financial management» and «RTE finance» is clarified on the basis of a synthesis
of various modern scientific approaches to the study of these categories and the identification of the main features for adaptation to energy conservation conditions. The necessity of applying the transitional stage for introducing the energy saving mode in the RTE is determined.

The study is interesting for the RTE of states with state administration, or a partial state form of ownership and requires the introduction of energy-saving technologies. Weaknesses. When conducting the analysis of financial management, the main focus is on RTE, which have only the state form of ownership. Analysis of private railways, which are characteristic of such states as the USA, Canada, etc., are not taken into account.

Opportunities. The study makes it possible to determine the features of the transition period in the management of RTE finances when applying energy conservation.

By defining the functions of finance, it is possible to introduce energy savings for RTE of countries such as China, Russia and other countries with RTE public administration.

Threats. The threats to the RTE financial management include the fact that a significant part of current expenses does not depend on the volume of traffic. About 40 % of the operating costs of railways are accounted for by the maintenance of infrastructure: track and energy facilities, signaling and communications facilities, any facilities and structures.

The objective of the RTE finances in the context of energy conservation is to ensure the absolute identification and mobilization of resources both at the RTE itself and, as a result, as a whole throughout the railway industry.

8. Conclusions

1. The principles of organizing the RTE finances are defined, which consist in the coordination of all the determining components of the financial system to achieve RTE stable operation and, no less important, its development. Effective financial management is designed to provide a solution to current issues of financing the production and sale of products. As well as the tasks of RTE survival in the competitive environment of the entire transport industry, stabilizing the financial situation, minimizing costs and increasing profits, cost-effective activities and increasing the volume of transport services. All this increases the value of the enterprise from the point of view of investment attractiveness and development prospects.

2. The analysis of RTE financial management in the energy saving mode, which allowed to clarify the content of concepts such as «financial management» and «RTE finances». This is done on the basis of a generalization of various modern scientific approaches to the study of these categories and the identification of the main features for adaptation to energy saving conditions. So, let’s consider RTE finances to be the system of monetary relations of the specified economic entity, that is, the totality of payments, receipts, distribution and use of funds in the process of its production and economic activity. Effective RTE financial management is the opportunity for organizational, financial and economic sustainability of RTE in the context of energy conservation, while minimizing losses from meeting the above conditions, thereby maximizing the economic added value of the enterprise during its operation and development.

3. The specificity of financial relations in railway transport in the conditions of energy conservation is determined. The specificity lies in the fact that while saving energy resources, the RTE should use such a managerial model that provides solutions to the interrelated tasks that arise with this method of managing.

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3. The specificity of financial relations in railway transport in the conditions of energy conservation is determined. The specificity lies in the fact that while saving energy resources, the RTE should use such a managerial model that provides solutions to the interrelated tasks that arise with this method of managing.