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ADVANCED VOCATIONAL TRAINING OF ENVIRONMENTAL PROFESSIONALS FOR PROVIDING SUSTAINABLE DEVELOPMENT OF RAILWAYS OF UKRAINE ON THE WAY TO EUROPEAN INTEGRATION

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Abstract. *The subject of the research* is to study the state of issue of advanced training of environmental professionals and specialists on six railways of Ukrzaliznytsia PJSC: Donetsk, Lviv, Odesa, Pivdenna (Southern), Pivdenno-Zakhidna (Southwestern) and Pridniprovska Railways. *The purpose* of the article is to study the issue of providing the necessary qualification level of postgraduate education (advanced training) of environmental professionals and specialists at six Ukrainian railways. *The methodology of the research*: In order to achieve the goal, the following methods are used in the article: 1) statistical methods and methods of comparative analysis; 2) questionnaires and expert surveys of environmental professionals and specialists; 3) taxonomic methods. *The novelty of the research*. The state of the issue of ensuring the necessary level of professional development of environmental professionals and specialists at six railways of Ukrzaliznytsia PJSC is investigated. Namely: 1. the state of the level of professional development of environmental professionals and specialists of 6 railways of Ukrzaliznytsia PJSC for the period from 2012 to 2016 is researched and evaluated; its structural and dynamic analysis is carried out; 2. calculations of taxonomic indicators of the level of development of career development system for environmental professionals and specialists as distribution of expenses for advanced training for 6 railways for 2012–2016 are made; 3. carried out a questionnaire of environmental professionals and specialists, whose list of functional responsibilities, in accordance with the job description (both staffed and part-time workers), includes issues of the use of natural resources and environmental protection – in order to clarify the availability of environmental education, the length of work in the railway, the length of work in positions associated with environmental activities, the level of satisfaction with the content of their work. *Conclusions*. To ensure the sustainable development of Ukrainian railways on the way to European integration, it is necessary to take into account the requirements and standards of the EU both in the reform of rail transport in general and in the management of its impact on the natural environment. The training of modern skilled personnel is an important part of the strategy of sustainable economic and ecological development of rail transport; therefore, a special attention should be paid to the training of environmental professionals and specialists working in positions related to the use of natural resources and environmental protection. The European direction of the railways of Ukraine requires new approaches to the education and professional development of such specialists. Summing up the results of the conducted researches, the authors of the article substantiated that both the structure of the number of environmental professionals and specialists who have increased the qualification, as well as the structure of costs for the advanced training of environmental professionals and specialists of six studied railways, which are parts of Ukrzaliznytsia PJSC, for the period from 2012 to 2016 are very volatile. Thus, they concluded that, during the period under review, such significant structural shifts do not comply with the principles and provisions of the sustainable development of railway transport enterprises.

Key words: advanced vocational training, environmental professionals, natural environment, railway transport enterprises, railways, advanced training costs.

JEL Classification: J44, L84, L92, F64, I21

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1. Introduction

The relevance of the research. The Strategy for Development of PJSC "Ukrzaliznytsia" (hereinafter – Ukrzaliznytsia) for 2017–2021 determines Ukrzaliznytsia's mission as ensuring sustainable development of Ukraine by providing high-quality and affordable transport and logistics services based on the principles of social and environmental responsibility, as well as an effective model of company management that will meet the challenges of the present, taking into account the future needs of the economy and the population (Key aspects of the Strategy for Development of PJSC "Ukrzaliznytsia" for the 2017–2021 years, 2017).

Ukrzaliznytsia provides 82% of freight and almost 50% of passenger traffic carried by all modes of transport. In terms of freight traffic, it ranks fourth in the Eurasian continent, second only to the railways of China, Russia, and India (Ukrzaliznytsia PJSC, 2018), and provides work to 285 500 people (data as of 30.06.2017) (Statistical data on Ukrainian railways, 2018). Railways – enterprises of railway transport of general use, which ensure the formation and implementation of state policy in the field of transport (Verkhovna Rada of Ukraine, 2012a).

The Concept of Sustainable Development was recognized by the UN World Conference on the Environment as the dominant ideology of civilization in the XXI century. The balance of ecological and economic interests is a valuable and cultural component of the model of sustainable development in countries of the European Union (hereinafter – the EU). Therefore, since European integration is the main foreign policy priority of Ukraine, and the EU sets high environmental standards, the sooner their implementation in Ukraine will be the key to further European integration in the field of environmental protection. This requires bringing the parameters of the functioning of railways in line with European environmental norms and standards.

In pursuance of the State Target Program for Rail Transport Reform for 2010–2019, which set one of the tasks of accelerating the integration of domestic rail transport into European and world transport systems, a number of measures are identified, in particular: improvement of environmental safety system is envisaged in order to improve the level of safety of passenger and cargo transportation; moreover, it is also envisaged to improve the quality of training of industry specialists (Cabinet of Ministers of Ukraine, 2009).

The strategic goals of the state environmental policy of Ukraine are recognized development of the Strategy for Environmental Education for the Purpose of Sustainable Development of Ukrainian Society and Economy of Ukraine by 2015; as well as the creation by 2015 of a system of environmental education and professional development of civil servants whose competence includes environmental protection (Verkhovna Rada of Ukraine, 2010). However, such an Environmental Education Strategy has not yet been developed, which has its negative consequences, as will be discussed below.

The EU sets standards and requirements for advanced training. Thus, the Recommendation of the European Parliament and the Council (2008/C 111/01) has defined general principles for ensuring quality higher education and vocational education and training in the context of European qualifications (European Parliament and Council, 2008). Directive 2001/16/EC of the European Parliament and the Council on 19.03.2001 on the interoperability of the conventional rail system contains conditions, in particular regarding the skill level of the personnel who operate and maintain it (Dvulit, 2015). Directive 95/18/EC stipulates the requirements for the skill level of safety staff (European Council, 1995). Directive 2004/49/EC sets requirements for the responsibility of each railway undertaking and each infrastructure manager for the level of training (including exams and certificates) and the qualifications of their personnel performing security-related work (European Parliament and Council, 2004).

As a result, the level of education, including professional development, of Ukrzaliznytsia employees becomes even more important in terms of the European direction of the Ukrainian railways on the basis of sustainable development.

The railway transport of Ukraine has a powerful and extensive system of professional development of workers, which includes training complexes directly at enterprises of the branch and own educational establishments – personnel professional development centres (centres of professional education). In general, 11 branch vocational and technical educational institutions operate at the railways, which carry out training, retraining, and professional development of the workforce. In accordance with requirements of the current legislation, the training, retraining and advanced training of workers for the needs of the industry are carried out at the expense of employer companies (Verkhovna Rada of Ukraine, 1996).

Nevertheless, one should note a negative tendency during 2012–2016 regarding the reduction in the number of workers trained in new professions that have undergone retraining or advanced training. This trend was observed in general both in the Ukrainian economy, in the transport sector, and in rail transport in particular. In addition, it should be pointed out that from 2015, in the static annual data provided by the State Statistics Service of Ukraine, there is no section "Professional Training and Professional Development of Employees", and hence official statistical information (State Statistics Service of Ukraine, 2018).

According to Article 7 of the Law of Ukraine "On Environmental Protection", ecological knowledge is a mandatory qualification requirement for all officials

whose activities relate to the use of natural resources and which has an impact on the state of the environment (Verkhovna Rada of Ukraine, 1991). However, for today, in most structural subdivisions of Ukrzaliznytsia environmental specialists are not specialized specialists, but engineers of technical departments, metrology engineers, health and safety engineers, energy, mechanic engineers, masters and other specialists, who are only assigned duties of ecologists in addition to other duties. These workers are overwhelmed by their main place of work with completely different issues that are not related to the environmental protection. Only about 9% of full-time employees are in positions of environmental professionals and specialists: in 2012 – 9.34%, in 2013 – 9.22%, in 2014 – 9.17%, in 2015 – 8.87%, in 2016 – 8.87%; and there is a tendency for an annual gradual decrease of this percentage. In addition, in some structural subdivisions, ecological responsibilities are generally separated by certain natural factors, namely air, waste, water, and assigned to different workers.

The actual neglect of mentioned in Article 7 of the Law of Ukraine "On Environmental Protection" at railway undertakings and, therefore, the lack of environmental professionals and specialists on the railways of Ukraine, as well as the inadequate level of their education and qualifications lead to a large number of environmental fines and claims and, consequently, the considerable expenses of Ukrzaliznytsia for the payment of these penalties and claims. Thus, according to the annual reports of the railways of Ukrzaliznytsia in 2016, 169 decisions to impose an administrative penalty for violating the requirements of environmental legislation on officials of production units are issued and, accordingly, these fines are paid – in the amount of 40.324 thousand UAH, And 10 claims in the amount of 3 902.834 thousand UAH are presented, of which actually 2 claims were reimbursed in the amount of 191 884.96 UAH (Kravets, 2017).

The main violations detected during inspections of Ukrzaliznytsia's production departments: waste management (55.5% of all fines), air protection (29%), land protection (3%), water resources protection (6.5%), in the field of protection, protection, use, and reproduction of forests (6%). There are also penal sanctions for organizational reasons that do not require material costs but only increased control over: the implementation of requirements of the legislation in the field of waste management, rules of technical operation of gas treatment plants. In addition, there has recently been a tendency to charge penalties for exceeding the permissible standards for discharging sewage into urban sewage networks. The main grounds for filing claims for damages for the harm caused to the environment are the lack or untimely receipt of permits and the unauthorized felling of trees (Reference, 2016).

All these negative phenomena testify to the ineffective management system for raising the skills of environmental professionals and specialists. Therefore, it is considered necessary to increase the number of competent, skilled specialists in the field of environmental protection and use of natural resources on the railways. In addition, environmentalists need to constantly improve their knowledge, skills, abilities, competencies and, therefore, to systematically improve their qualifications and confirm their level with relevant certificates. And the management of railways of Ukraine should, taking into account the European direction of the railways of Ukraine, make managerial decisions regarding the proper financing and distribution of funds for the training of environmental professionals and specialists responsible for environmental resources management sphere.

The subject of the research is to study the state of the issue of advanced vocational training of environmental professionals and specialists at six railway undertakings of Ukraine (hereinafter – the railways (Cabinet of Ministers of Ukraine, 2014)): State Enterprise "Donetsk Railways" (hereinafter – Donetsk Railways), State Territorial Branch Association "Lviv Railways" (hereinafter – Lviv Railways), Odesa Railways, State Enterprise "Pivdenna Railways" ("Southern Railway", hereinafter – Pivdenna Railways), State Territorial Branch Association "Pivdenno-Zakhidna Railways" (hereinafter – Pivdenno-Zakhidna Railways), State Enterprise "Prydniprovska Railways" (hereinafter – Prydniprovska Railways).

The purpose of the article is to study the problem of providing the necessary skill level of postgraduate education (advanced training) of environmental professionals and specialists on six railways of Ukrzaliznytsia. The following tasks are set for the achievement of the set goal: 1. to study and evaluate the state of the level of professional development of environmental specialists and specialists of 6 railways of Ukrzaliznytsia for the period from 2012 to 2016 and to carry out its structural and dynamic analysis; 2. to conduct calculations of taxonomic indicators of the level of development of career development system for environmental professionals and specialists as distribution of expenses for advanced training for 6 railways for 2012–2016; 3. to carry out a questionnaire of environmental professionals and specialists, whose list of functional responsibilities, in accordance with the job description (both staffed and part-time workers), includes issues of the use of natural resources and environmental protection – in order to clarify the availability of environmental education, the length of work on the railway, the length of work in positions associated with environmental activities, the level of satisfaction with the content of their work.

Research methodology: in order to achieve the target goal and solve the set tasks, the following methods are used in the article: 1) statistical methods and methods of comparative analysis – for structurally-dynamic

analysis of the number of environmental professionals and specialists working in positions related to the environmental protection; the number of those who passed the advanced training; costs of advanced training by railways of Ukraine; 2) questionnaires and expert surveys of environmental professionals and specialists, whose list of functional responsibilities includes issues of the use of natural resources and environmental protection, – to study and evaluate the availability of environmental education, the length of work on the railway, the length of work in positions associated with environmental activities, the level of satisfaction with the content of their work; 3) taxonomic methods – to assess the development of a system for allocating costs for the training of environmental professionals and specialists for each of these six railways for each of the 5 years studied (2012, 2013, 2014, 2015, 2016).

The scientific-theoretical and methodological basis of the research consisted of scientific works and publications of scholars, materials of scientific conferences in the field of development of enterprises of the transport industry in general and railways in particular, the study of issues of professional development of employees.

The information base for the study consists of: statistical data of the Ministry of Infrastructure of Ukraine and PJSC "Ukrzaliznytsia", the State Statistics Service of Ukraine, statistical reporting and initial documentation of the railways of Ukrzaliznytsia; Internet resources, results of questionnaires and polls of environmental professionals (Reference on the use of results and individual proposals of Dvulit Z. P., presented in the thesis for the degree of Doctor of Economics on the topic: "Economic and Environmental Management of the Sustainable Development of Rail Transport Enterprises" № 1/21-16 on 19.10.2016) etc. Economic calculations are made using modern methods and computer technologies for the processing of statistical materials.

The novelty of the research. The state of the issue of ensuring the necessary level of professional development of environmental professionals and specialists on six railways of Ukrzaliznytsia is investigated. Namely: 1. the state of the level of professional development of environmental professionals and specialists of 6 railways of Ukrzaliznytsia for the period from 2012 to 2016 is researched and evaluated; its structural and dynamic analysis is carried out; 2. calculations of taxonomic indicators of the level of development of career development system for environmental professionals and specialists as distribution of expenses for advanced training for 6 railways for 2012–2016 are made; 3. carried out a questionnaire of environmental professionals and specialists, whose list of functional responsibilities, in accordance with the job description (both staffed and part-time workers), includes issues of the use of natural resources and environmental protection – in order to clarify the availability of environmental education, the length of work on the railway, the length of work in positions associated with environmental activities, the level of satisfaction with the content of their work.

2. Professional development of environmentalists and railway specialists

Education is the basis of the intellectual, spiritual, physical, and cultural development of the individual, its successful socialization, economic prosperity, the key to the development of society, united by common values and culture, and the state. The purpose of education is the comprehensive development of human being as a person and the highest value of society, its talents, intellectual, creative, and physical abilities, formation of values and competencies necessary for the successful self-realization, education of responsible citizens who are capable of conscious social choice and directing their activities in favour of other people and society, enriching on this basis the intellectual, economic, creative, and cultural potential of the Ukrainian people, raising the educational level of citizens for the sustainable development of Ukraine and its European choice. Postgraduate education includes professional development – acquiring new and/or improving previously acquired competencies by a person within the framework of professional activity or field of knowledge (Verkhovna Rada of Ukraine, 2017).

According to the Law of Ukraine "On Professional Development of Employees" (Verkhovna Rada of Ukraine, 2012b), the main areas of work of employers in the field of professional development of employees are, in particular: organization of professional training of employees; stimulating them for professional growth; provision of advanced training directly by the employer or educational institutions usually not less than once every five years. Advanced training of the employer's employees is continuous and carried out during their work in order to gradually expand and deepen their knowledge, skills, and abilities in accordance with the requirements of production. To this end, the employer periodically arranges for the employees professional training, retraining, and advanced training through a collective contract and agreements.

In its turn, the Law of Ukraine "On Environmental Protection" (Verkhovna Rada of Ukraine, 1991) states that raising the ecological culture of society and professional training of specialists are provided by the general obligatory complex education in the field of environmental protection, including in the system of vocational and higher education, advanced training and retraining.

In order to meet the needs of the railway industry in the retraining and professional development of managers and specialists, there is a Postgraduate Training Centre at the State University of Infrastructure and Technology, which provides education services, where managers and

specialists of different structural divisions of railways of Ukraine, whose duties include the use of natural resources and environmental protection, improve their qualification. During training, environmental professionals improve their qualification in the direction "Efficiency of introducing environmentally sound technologies in railway transport".

3. Structural and dynamic analysis of advanced training by environmentalists and specialists of Ukrzaliznytsia

The number of specialists dealing with the use of natural resources and environmental protection, in total on 6 railways in 2012 amounted to 846 people, of which only 79 people work full-time (9.34%), while 767 people work on a part-time basis (90.66%); in 2013 – 835 people, among them work full-time – 77 people (9.22%), work part-time – 758 people (90.78%); in 2014 – 807 people, among them full-time – 74 people (9.17%), part-time – 733 people (90.83%); in 2015 – 778 people, among them full-time – 69 people (8.87%), part-time – 709 people (91.13%); in 2016 – 778 people, among them full-time – 69 people (8.87%), part-time – 709 people (91.13%). As we can see, over five years the total number of specialists has decreased by 68 people or 8.04%, including there was a decrease in 2016 compared to 2012 in staff employees for 10 people or 12.66%, and part-time workers – 58 people (7.56%). Based on annual reports from railway undertakings on environmental protection, in Fig. 1, we presented this dynamics of the number of specialists dealing with the use of natural resources and environmental protection – in total for 6 railways for 2012–2016.

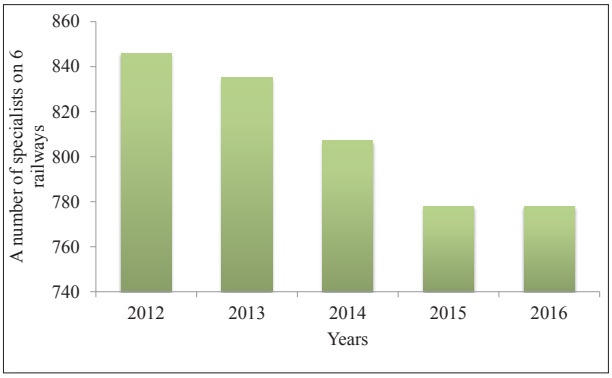

Fig. 1. Dynamics of the number of specialists on the railways that deal with issues of environmental protection in general on 6 railways in 2012–2016

Let us track the dynamics of the number of specialists involved in the use of natural resources and environmental protection, who have undergone advanced training in 2012–2016, for each of 6 railways, as shown in Fig. 2. Moreover, on 6 railways in general, in 2012, from 846 people – 67 people have passed the advanced training, that is, 37%; in 2013, from 835 people – 25 people (14%); in 2014, from 807 people – 30 people (17%); in 2015, from 778 people – 25 people (14%); in 2016 from 778 people – 33 people (18%). This testifies to the uneven tendency over these 5 years as to the number of specialists who have passed the advanced training in the environmental field. Thus, compared to 2012, when 37% of specialists have undergone advanced training, there has been a significant decline in their number since 2013 and, in the following years, their number was approximately uniform: 14% in 2013, 17% in 2014, 14% in 2015, and 18% in 2016. Altogether, for the period of

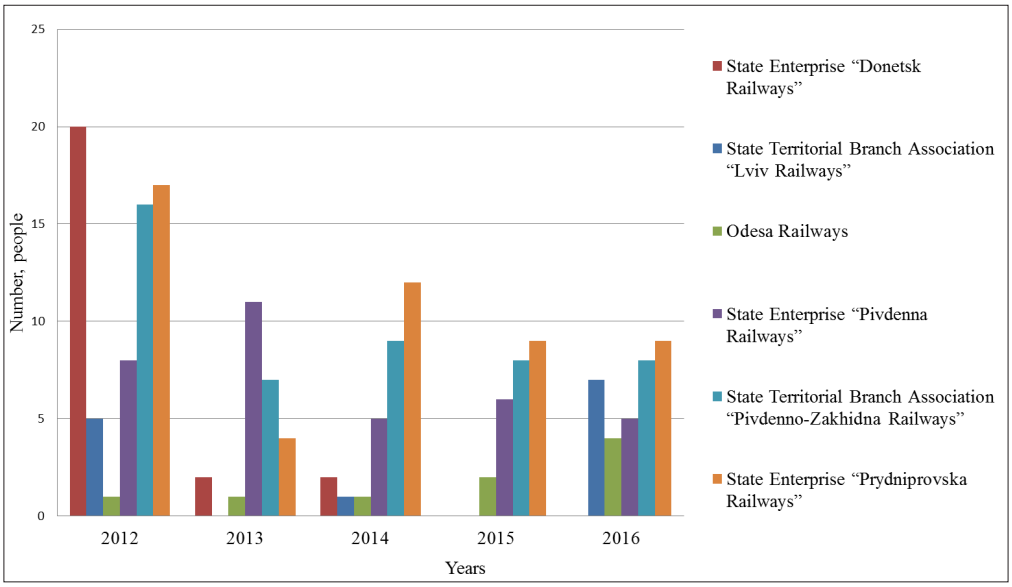

Fig. 2. Dynamics of the number of specialists on 6 railways that deal with the use of natural resources and environmental protection, who have passed the advanced training in 2012–2016

5 years in total for 6 railways, 180 people have passed the advanced training, including: on the Prydniprovska Railways – 51 people, Pivdenno-Zakhidna Railways – 48 people, Pivdenna Railways – 35 people, Donetsk Railways – 24 people, Lviv Railways – 13 people, Odesa Railways – 9 people.

Fig. 3-8 reflect the ratio of the total number of specialists dealing with issues of the use of natural resources and environmental protection, and the number of environmental professionals who have improved their qualifications – for each of 6 railways for 2012–2016.

The highest level of advanced training is on the Prydniprovska Railways, where, in total, for the last five years it was passed by 51 environmental professionals, and the lowest – Odesa Railways, where only 9 people have passed it. Among 6 studied railways, no environmental professional has upgraded his qualification on the Donetsk Railways in 2015 and 2016 and on the Lviv Railways in 2013 and 2015. It should be noted that there is a very uneven structure of the number of environmental professionals who have improved their qualifications, both in the section of railways and by year.

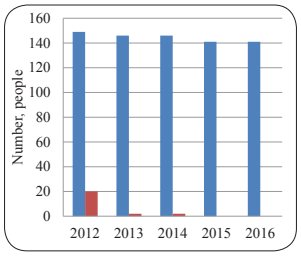

Fig. 3. State Enterprise "Donetsk Railways"

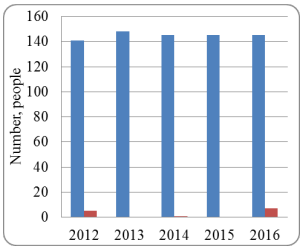

Fig. 4. State Territorial Branch Association "Lviv Railways"

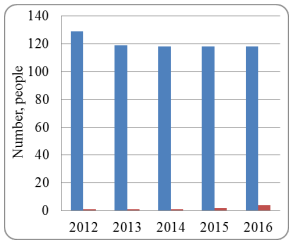

Fig. 5. Odesa Railways

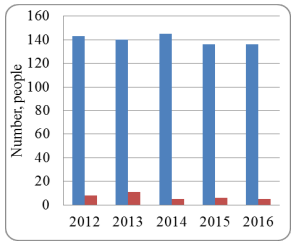

Fig. 6. State Enterprise "Pivdenna Railways"

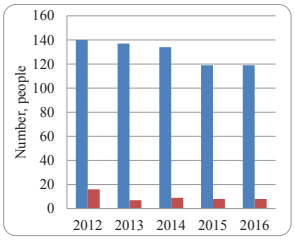

Fig. 7. State Territorial Branch Association "Pivdenno-Zakhidna Railways"

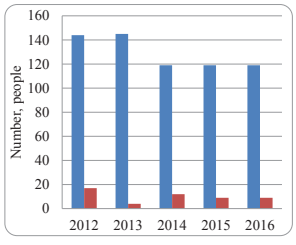

Fig. 8. State Enterprise "Prydniprovska Railways"

Note: – *the total number of specialists, dealing with the use of natural resources and natural environment protection,* – *number of environmental professionals who have improved their qualifications.*

The highest percentage of environmental professionals who have improved their qualifications to the total number of specialists dealing with the use of natural resources and natural environment protection was on three railways in 2012: Donetsk Railways – 13.42%, Prydniprovska Railways – 11.81%, Pivdenno-Zakhidna Railways – 11.43%, however, there was a downturn in subsequent years. The other three railways had the highest figures for the number of ecologists who improved their qualifications to the total number of specialists involved in the use of natural resources and environmental protection, as follows: Pivdenna Railways – 7.86% in 2013, Lviv Railways – 4.83% in 2016, Odesa Railways – 3.39% in 2016. The lowest percentage of the number of environmental professionals who have improved their qualification to the total number of specialists dealing with the use of natural resources and environmental protection on the Odesa Railways for all 5 years (2012–2016) – below 1% in 2012–2014 (0.75% in 2012, 0.84% in 2013, and 0.85% in 2014), 1.7% in 2015, and 3.39% in 2016. In addition, on each of five other railways, it was the lowest in some years: Donetsk Railways – 0.00% in 2015 and 2016, Lviv Railways – 0.00% in 2013 and 2015, Prydniprovska Railways – 2.76% in 2013, Pivdenna Railways – 3.68% in 2016, Pivdenno-Zakhidna Railways – 5.11% in 2013.

Thus, the ratio of the number of environmental professionals who have improved their qualification to the total number of specialists dealing with the use of natural resources and natural environment protection has changed during 5 years under study on 6 railways as follows: Donetsk Railways – from 0.00% to 13.42%, Lviv Railways – from 0.00% to 4.83%, Pivdenno-Zakhidna Railways – from 5.11% to 11.43%, Prydniprovska Railways – from 2.76% to 11.81%, Odesa Railways – from 0.75% to 3.39%, Pivdenna Railways – from 3.68% to 7.86%.

Moreover, it should be noted that the total number of environmental professionals and specialists on each railway in the last 5 years has changed somewhat unevenly, however, in five railroads (except Lviv) in 2016 compared with 2012 there was a decrease in the total number of these workers, and this reduction was observed gradually every year from 2012 to 2016 on most railways. The divergence in the total number of environmental professionals and specialists fluctuated by railways as follows: Donetsk Railways – 5.37%; Lviv Railways – 4.73%; Pivdenno-Zakhidna Railways – 15.00%; Prydniprovska Railways – 17.93%; Odesa Railways – 8.52%; Pivdenna Railways – 6.2%.

4. Dynamics of expenses of railways for advanced training

Let us track the dynamics of costs for the training of environmental professionals in total for 6 railways during 2012–2016, which is shown in Fig. 9.

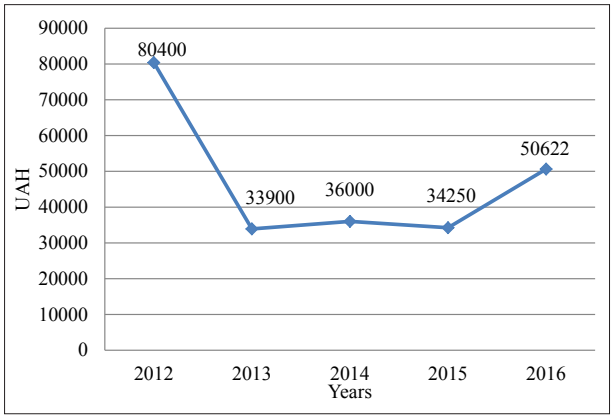

Fig. 9. Dynamics of costs for the advanced training of environmental professionals in total for 6 railways during 2012–2016, UAH

As we can see, there was a sharp decline in costs in 2013, compared to 2012, more than doubled (which correlates with 37% of environmentalists who have completed advanced training in 2012 – compared with 14% in 2013); this tendency for minor expenses was maintained during 2014–2015 (which also correlates with 17% of environmentalists who have undergone advanced training in 2014, and 14% in 2015), and in 2016 there was an increase in costs by almost half, which, however, was only about 60% of the amount of costs in 2012 (with the fact that in 2016 only 18% of environmentalists have completed advanced training – almost as much as in previous years of 2013–2015).

Let us analyse the costs incurred by Ukrzaliznytsia for advanced training of environmental professionals during 2012–2016 in the percentage for each of 6 railways. The structure of distribution of costs for training was uneven and unstable. As none of the environmental professionals improved qualification on the Donetsk Railways in 2015–2016 and on the Lviv Railways in 2013 and 2015, therefore, there were no corresponding costs for these railways in the specified years. A more or less stable structure of the distribution of costs for advanced training during this period was peculiar for the Pivdenno-Zakhidna Railways, the cost of which in the structure of total cost of 6 railways ranged from 23.88% to 32%. In the remaining 5 railways, this structure was leap-shaped and uneven. The largest fluctuations in the structure of distribution of costs for advanced training were on the Pivdenna Railways: from 11.94% to 44%. The lowest costs for the professional development of environmental professionals in total for the 5 years studied were on the Odesa Railways, even lower than in Lviv and Donetsk, where there were no such expenses for two years at all. And the highest costs in total for 5 years were on the Prydniprovska Railways – five times more than in Odesa; on the Pivdenno-Zakhidna Railways – almost five times as much, as well as on the Pivdenna Railways – where it was almost four times more costs than on the Odesa Railways.

For the study of the state of the level of professional development of environmental professionals on 6 railways, the definition of the structure of the distribution of costs for their postgraduate education in the context of 2012–2016, it is expedient to involve methods of multidimensional comparative analysis. This is determined by the multiplicity of objects and processes that are characterized by the versatility and ambiguity of Ukrainian railways as complex dynamic systems.

Thus, let us calculate taxonomic indicators of the development level of the system of distribution of costs for the training of environmentalists on 6 railways of Ukrzaliznytsia on the algorithm of taxonomic analysis (Syrvetnyk-Tsarii V.V. and Duliaba N.I., 2016; Iliash O.I., 2012; Pliuta V., 1980): formation of the matrix of observations, standardization of values of elements of the matrix of observations, identification of the vector-standard, determination of the distance between individual observations and the vector-standard, calculation of the taxonomic coefficient of development. The taxonomic index can reach the value in the interval [0;1] and has the following interpretation: the closer the value of the generalization indicator to one, the more developed the individual object (process) in this period. With its help, it is possible to estimate the "average" level of values of characteristics characterizing a phenomenon or a process reached in a certain period or a time point.

The calculations of the taxonomic indicator of the level of development of the system for allocating costs for the improvement of the qualification of environmental professionals in total for 6 railways in 2012–2016 calculated by us showed the following values ranging from 0.3608 to 0.4742: K2012=0.3608, K2013=0.3921, K2014=0.4485, K2015=0.4742, K2016=0.4356. Thus, by gradation of values of the indicator, it is established that all 5 surveyed years were characterized by an indicator below the average, which is evidence of an ineffective allocation of funds for advanced training in total for 6 railways per study year. True, the level of development of the system for allocating costs for the training of environmental professionals in total for 6 railways has shown a tendency for annual gradual growth over 2012–2015: from 0.3608 in 2012 to 0.4742 in 2015, however, slightly decreased to 0.4356 in 2016.

Moreover, the value of the taxonomic indicator for 2012 by individual railways was in the range from 0.2 to 0.39, which corresponds to the low level of development of the system for allocating costs for the training of environmental professionals. And over the next four years, the value of this indicator on individual railways ranged from 0.4 to 0.59, which, while indicating its rise to the average level of development of the system of cost allocation, however, had little leaping tendency: during three years from 2013 to 2015, there was an increase in the value of taxonomy indicators, and in 2016 it decreased by 8.14%.

4. Questioning of environmental professionals and specialists of Ukrzaliznytsia

Given the uneven tendency on 6 railways in relation to decreasing in 2013–2016 compared to 2012 in the number of environmental professionals who have undergone an advanced training, let us investigate this problem in more detail. For the purpose of this study, we conducted a questionnaire survey of managers and specialists of various structural divisions of 6 Ukrainian railways in advanced training courses at Postgraduate Training Centre of the State University of Infrastructure and Technology in the period from September 12 to 23, 2016 (Reference, 2016).

The choice of the form of an expert survey is determined by the purpose of sociological research, available resources, processing possibilities of the received data. Therefore, we used a polling form, such as a one-time individual survey (questionnaire).

The questionnaire consisted of 6 questions, forms for filling in the personal data of the respondent and provided for self-esteem results. The questions were of open and closed formats. In the form of filling in the respondent's personal data, it was foreseen to find out the education in the environmental specialty; work experience in positions related to environmental activities; the work experience in Ukrzaliznytsia in general and in the positions, the list of functional responsibilities, in accordance with the job description (both staffed and part-time workers), includes issues of the use of natural resources and environmental protection; as well as satisfaction with the content of activities in positions held. The experts conducted a self-assessment on a point scale. Such additional information made it possible to set the level of the expert group as a whole. Principles of small samples and the sufficiency of information were chosen to form the volume of the sample population.

The list of respondents who formed the sample population covered 31 environmental professionals and specialists (managers, chiefs, deputy chiefs, specialists, engineers on the ecology of services, departments, sectors, directorates, structural units, stations, railways, and other enterprises of railway transport). The questionnaire included the following questions: 1. age of the employee; 2. work experience in Ukrzaliznytsia; 3. work experience in positions related to environmental activities; 4. work experience in Ukrzaliznytsia in positions, which list of functional responsibilities, in accordance with the job description (both staffed and part-time workers), includes issues of the use of natural resources and environmental protection; 5. availability of higher education in an environmental specialty; 6. satisfaction with the content of work in a position.

As a result of the processing and systematization of data obtained during the survey, we have set the following. The average age of the respondents was 39 years, the youngest employee was 24 years old, and the oldest – 59 years old. The work experience of the respondents in Ukrzaliznytsia varied from 2 to 40 years, and on average it was 16 years. The average work experience in positions related to environmental activities was 8 years, that is, half of the length of work on Ukrzaliznytsia, 2 of respondents had such experience only up to 1 year, 20 people had 10 years of work experience, and 9 persons – more than 10 years, one of whom has been working for such a post for 27 years. The average length of work in Ukrzaliznytsia in the posts, which list of functional responsibilities, in accordance with the job description (both staffed and part-time workers), includes issues of the use of natural resources and environmental protection, was 7 years. A particular attention is paid to the fact that only 5 employees or 16.13% of the total number of respondents have professional environmental education, that is, the rest 83.87% have no such education. 16 persons or 51.61% are satisfied with the content of work performed on a position, unsatisfied – 7 people or 22.58%, partially satisfied – 8 people or 25.81%.

Consequently, we can draw the following conclusions from our survey of environmental professionals and specialists of Ukrzaliznytsia:

1) a very low percentage of employees who have higher education in an environmental specialty;

2) for the most part, they are employees who have sufficient work experience in positions related to environmental activities, but a half of them are actually dissatisfied with the content of the work performed and, therefore, it has a significant impact on the quality of their functional responsibilities and productivity and thus not promotes their acquisition of new and/or improved competences previously acquired within the framework of their professional activities in the field of environmental protection.

5. Research conclusions

In order to ensure the sustainable development of Ukraine's railways on the way to European integration, EU requirements and standards must be taken into account both in the reform of rail transport in general and in the management of its impact on the natural environment. The training of modern skilled personnel is an important part of the strategy of sustainable economic and ecological development of rail transport; therefore, a special attention should be paid to the training of environmental professionals and specialists working in positions related to the use of natural resources and natural environment protection. The European direction of the railways of Ukraine requires new approaches to the education and professional development of such specialists.

Summing up the results of our research, we are convinced that both the structure of the number of

environmental professionals and specialists who have increased the qualification, as well as the structure of costs for the training of environmental professionals and specialists of six studied railways, which are a part of Ukrzaliznytsia, in the period from 2012 to 2016 is very volatile. Thus, we arrive at the conclusion that during the analysed period, such significant structural changes do not correspond to the principles and provisions of the sustainable development of rail transport enterprises.

And therefore, this structure needs to be improved and optimized to ensure the stability and predictability of costs of advanced training of environmental professionals and specialists in order to reduce costs of violating environmental legislation, minimizing the amount of fines and claims, rational use of nature and environmental measures, as well as to meet the requirements of the European legislation in the field of environmental protection and quality of postgraduate education in terms of qualification improvement of environmental professionals and specialists of railway transport enterprises.

The results of the carried out research made it possible to conclude that there is no complete information array regarding the current state of the issue of professional development of environmental professionals and specialists, including assessment of the availability of environmental education, work experience, and satisfaction with the content of functional responsibilities in positions occupied. Thus, first of all, it is necessary to recognize the existence of this problem and, therefore, it is necessary to adopt appropriate managerial decisions in the direction of solving the identified problem, which in the future will make it possible to reduce, and subsequently, prevent the occurrence of environmental penal sanctions and claims against Ukrzaliznytsia, and other unpredictable costs.

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