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# SYSTEM OF FORMATION OF PSYCHOPHYSICAL POTENTIAL OF TRANSPORT INDUSTRY SPECIALISTS' DEVELOPMENT

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## Abstract

The high dynamics of information, technical and technological, logistics and organizational indicators of the development of transport production complicates the requirements for professional training, dictating the need to form a competitive specialist, whose effectiveness and success are determined by the criteria of adaptability and mobility in the changing conditions of the professional world. A distinctive feature of the professional activity of specialists in the transport industry is the cumulative impact of occupational risks (physical, psychological, social, technospheric), the consequences of which may be reflected in danger to the life and health of employees and passengers; the occurrence of states of anxiety and stress, professional burnout; loss of control, violations of labour and technological discipline; emergencies; financial losses for the industry. The analysis of scientific research made it possible to determine the essence of the concept of "psychophysical potential of professional development of transport industry specialists" as an integrative personality quality, the structure of which is represented by motivational and value, activity and technological and reflexive components. The indicators of these components are expressed by the abilities and qualities of the individual and allow to resist the complex influence of professional risks.



*Keywords:* Didactic system, professional risks, the psychophysical potential of professional development of transport industry specialists, professional and applied physical training

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## 1. Introduction

The post-industrial stage of development of society is featured by high dynamics of changes in the economic, social, organizational and technological foundations of production. It sets the qualitative indicators of the trajectory of the development of the production environment, among which the main ones are the following: randomness, imbalance, uncertainty and variability. This challenge complicates the requirements for professional training, dictating the need to form a competitive specialist, whose effectiveness and success are determined by the criteria of adaptability and mobility in the changing conditions of the professional world.

The activities of the transport complex of the Russian Federation are distinguished by active information, technical, technological and spatial development, modification of logistic and organizational structures. It significantly increases the level of influence, coverage and variability of the implementation of the negative consequences of occupational risks (biological, psychological, social, man-induced etc.) for workers, passengers and cargo. The concept of "risk", in professional pedagogy, has a multifaceted and mobile character, but the majority of researchers, define it as a set of factors that characterize the features of a certain type of activity and produce the frequency of realization of dangers while identifying its essence (Belov, 2017; Brodetskiy et al., 2017; Dondukov, 2009). Risk management is understood as finding the most effective ways to solve professional problems in conditions of variability, chaos and uncertainty. The risk implementation process is not conditional and has a probabilistic nature. In the chain of cause-and-effect relationships, both the ways of escalating risk situations and the likelihood of negative consequences in the process of transitions from one element of risk to another can be variable. Maintenance and repair; technological and administrative management requires the implementation of types of professional activities that set the conditions for the safe and trouble-free functioning of the transport and logistics system "human- technology - production environment

## 2. Problem Statement

Researchers distinguish the subjective and activity levels of the manifestation of professional risks. The subjective level is characterized by physiological, physical, psychological, social and other capabilities and limitations of a specialist, affecting the effectiveness and efficiency of his professional actions. In particular, the ability to maintain the necessary level of working capacity, the basis for which are indicators of the development of functional stability of the organism, general and special endurance; combining actions and working operations of various orientations, which requires developed qualities of attention, psychological and emotional stability, operational thinking, etc. The activity level of the influence of professional risks requires finding the most effective strategy or solving professional problems in non-standard conditions of professional activity (time limits; high level of personal responsibility; large volumes or insufficient information, incidents or emergencies) (Kolinenko, 2001; Zhukova, 2019).

Consequently, the safety issues of the professional activities of transport industry specialists have a priority and coordinating nature during solving professional problems that ensure the effective and

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reliable functioning of all production and management processes (specifics of professional activity). A distinctive feature of the professional activity of specialists in this area is the cumulative impact of occupational risks, the consequences of which may be reflected in danger to the life and health of employees and passengers; the occurrence of states of anxiety and stress, professional burnout; loss of control, violations of labour and technological discipline; emergencies; financial losses for the industry (Kononov, 2007; Mikhailova et al., 2019).

## 3. Research Questions

Analysis of qualification and corporate requirements, federal state educational standards of higher education of transport universities of the Russian Federation (which are the main criteria for the professional training of specialists) contain provisions regulating the level and amount of knowledge, skills and the quality of the formation of the graduates' competencies in humanitarian, socio-economic, mathematical, natural science and specialized fields; in the field of traffic safety, safety, labour protection, fire safety, prevention and elimination of the consequences of emergencies; energy and resource-saving; information technologies in the system of organizing professional activities.

Thus, the substantiation of the effective characteristics of the professional training of the transport industry specialists is associated with the identification of its structure and content, the determination of mechanisms and means of formation based on the development and transformation of the content, the functional content of the professional activity and the probabilistic nature of the cumulative impact of professional risks that are taken into account.

## 4. Purpose of the Study

Content analysis of the competencies specified in the regulatory documents revealed an insufficient representation of compliance of psychological and physiological qualities and professional suitability of specialists presented in the main provisions of professional selection in the professional training of transport industry specialists of indicators reflecting the level. This situation is aggravated by the declining level of health of the working-age population and student youth due to the influences of economic, environmental, technological, informational factors in the development of modern society. This is confirmed by data showing a high turnover of personnel, rejection of specialists and students by medical commissions on the indications of professional suitability during routine examinations for admission to work and industrial practices.

## 5. Research Methods

Generalization of the experience of vocational training of universities of communications and the results of applied research aimed at bringing the qualities of the subject of labour to the conditions of professional activity revealed the presence of different approaches in the design of a specialist personality model, the formulation of urgent educational tasks with identical socio-economic and technical-technological trends of professional activity development (Table 1). A content-related analysis of the

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research results allows making a statement that the state order regulates the level and quality of mastering the basics of professional activity with qualification characteristics that fill the professional competence of a specialist. Researchers distinguish readiness for professional activity, in the aspects of its motivational, physiological, psychological and motor components in terms of the structure professional competence of specialists in the transport industry (Petrov, 2010; Sadovskiy & Popov, 2019). At the same time, it shall be noted that the phenomenon of "professional readiness" outlines the basic and pre-start state of the individual, which has a temporary nature (the reason is the rapidly changing conditions of professional activity).

**Table 1.** Materials of content-analysis of scientific papers

| Performance feature | The aspect of problem study | Formation means |
|---|---|---|
| Motor readiness (G. Ya. Galimov, V. A. Sadovskiy) | Professiographic analysis of the labour processes of railway transport specialists (conditions, features of the regulations, dynamics, functional duties, occupational hazards) | Profiled physical culture |
| Physiological readiness (Yu. D. Kulikov, T. P. Zinchenko, A. A. Frumkina) | The relationship of the health status of specialists with the reliability of the manifestation of its psychophysical characteristics in the professional activities of specialists of the dispatching apparatus | Industrial physical culture |
| Psycho-emotional readiness (T. Yu. Stepina, I. A. Vaseltsova, M. A. Cherepanova) | The level of stress, operational and psychological tension of professional activity associated with the control of machines in transport technical systems | Applied physical training |
| Motivational readiness to health preservation (E. A. Kolinenko, E. N. Mironenko, A. B. Brodetskiy) | The structure of motives for maintaining a healthy lifestyle, physical activity of future specialists of railway transport, taking into account the level of their physical condition, predicted working capacity and working conditions | Physical education |
| Professional reliability (D. O. Belov, S. A. Petrov) | Preservation of the normative function of the professional activity of railway transport specialists in conditions of danger, uncertainty and alternativeness | Applied physical training |
| Health preservation competences (I. A. Vaseltsova, O. N. Mikhailova) | The structure (readiness, knowledge, experience, regulation) and content of the components of health preservation competence as a potential significant ability of an individual to implement certain social and professional functions that contribute to successful adaptation and effective professional activity | Applied physical training |
| General professional technological competence (Ya. V. Chub) | Revealing the content and functions of the professional activity of railway transport specialists based on a universal codifier matrix | Applied physical training |

The analysis of “professional readiness”, “professional reliability”, “social competencies” categories shows their substantive closeness (within the framework of the studied problem) since it

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characterizes the level of professional activity mastering, which makes it possible to realize the social, physical and psychological resource created in educational institutions. It shall be emphasized that more than 60% of the formulations that define the content of competencies in the Federal State Educational Standard of Higher Education begin with the word "ability". The concept of "ability" is understood as individual psychological characteristics of a person, the formation of which occurs based on inclinations in the process of mastering a certain activity. About 40% of competencies are described through “readiness”. Readiness as a motivational-actualizing link, during comparison (within the framework of concepts) with ability, turns into a mechanism that allows mobilizing internal resources to achieve a goal.

It has been revealed that the main means of formation of the model characteristics of a specialist are profiled types of physical culture, the main of them are professionally applied physical training. Its practical (activity) character, due to the psychological and physiological identity of the labour process and physical training, allows to carry out an effective form of "working dynamic stereotypes", i.e. motor skills and abilities in their motor structure are as close as possible to the main labour actions of a specialist. And the unity and interdependence of the physical, psychological, intellectual, creative and social (spiritual) content components of the professionally applied physical training contribute (by the principle of multiplicativity) to the integration of knowledge, skills, abilities and personal qualities of a student as a subject of professional activity, opening up the prospect of professional and personal growth (Chistyakov, 2019; Gladilina et al., 2018; Yumashev et al., 2018).

## 6. Findings

The psychophysical potential of a specialist's professional development can be effectively formed in the process of functional integration of its components. The motivational-value component is a system-forming and starting mechanism that actualizes professionally significant abilities and mobilizes internal reserves to achieve the goal. The main indicators of the formation of this component are professional orientation, value orientations, motives, interests, organizing cognitive and practical activities aimed at the maintenance of a healthy lifestyle, preservation and strengthening health, mastering the values of physical culture, professional self-development.

The resource base is the activity and technological component, represented by an integrated set of interconnected physiological, physical, psychological abilities that allow mastering knowledge, methods and types of activity (invariants) through the formation of new connections between individual objects and their properties, between different situations and their causes (Lavrov et al., 2019).

Thus, the psychological and physical potential of professional development of a specialist in the transport industry can be defined as an integrative personality quality, including motivational-value, activity-technological and reflexive components, the indicators of which are expressed by the abilities and qualities of the individual, allowing to resist the complex influence of professional risks.

The didactic system for the formation of the psychophysical potential of the professional development of transport industry specialists is part of the general system of professional training and it integrates methodological, substantive, procedural and effective elements. Methodological approaches within the framework of the system are highlighted based on socio-professional and methodological parameters.

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The system-activity approach is determined by conventional determinants that make it possible to describe the pedagogical process within the framework of the canons of scientific analysis. It allows determining the relationship of an integral system with a professional environment based on correlating the types of professional activities of specialists in the transport industry with the main types of activities of vocationally applied physical training. The principles of complementarity and synergy set the logic of the development of the system's elements, the one direction and interconnection of their actions, which make it possible to enhance the final result.

The content element of the system has been designed based on a contextual approach (principles of context, modularity and emergence), the selection of these principles have been determined by social and professional determinants. This approach allows simulating the content of professional activity in the context of its social and subject-technological components by the means of educational activity. The principle of modularity determines the choice of content and means of forming the psychophysical potential of professional development. Thematic modules are related to each other (directly or indirectly) and have a single structure, consisting of three elements (informational-content, performance, diagnostic) (Fakhertdinova et al., 2021; Zolkin et al., 2020).

The procedural element of the system is based on the principles of consciousness and activity, accessibility and dynamism (subject-activity approach). This approach is aimed at the formation of indicators of motivational-value, activity-technological and reflexive components in the structure of the psychophysical potential of professional development of transport industry specialists. The complex of means includes basic sports, complexes of physical exercises, and methods of active learning (stage-by-stage design of the basis of motor action, task-problem, simulation). This allows to carry out gradually development of professionally significant psychomotor features; to form the functional resistance of the body to the effects of unfavourable environmental factors; to master the maximum possible fund of motor skills and abilities that are as close as possible to working activities; play the role of social interaction.

The effective element of the system includes a complex of quantitative and qualitative test tasks, diagnostic procedures that allow assessing the level of formation of indicators in the structure of the components of the psychophysical potential of professional development of specialists in the transport industry.

## 7. Conclusion

Thus, the developed didactic system is based on a close relationship of structural characteristics, has a holistic structure and can be used in the design of special courses in vocational physical training in transport universities.

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