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МАТЕРІАЛИ

двадцять другої науково-практичної міжнародної конференції

«Міжнародна транспортна інфраструктура, індустріальні центри та корпоративна логістика»

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МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
МІНІСТЕРСТВО РОЗВИТКУ ГРОМАД ТА ТЕРИТОРІЙ УКРАЇНИ
ТРАНСПОРТНА АКАДЕМІЯ УКРАЇНИ
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ІНСТИТУТ ЕКОНОМІКИ ПРОМИСЛОВОСТІ НАН УКРАЇНИ

Матеріали

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SAFETY CULTURE AS THE BASIS FOR RISK MANAGEMENT IN RAILWAY COMPANIES

КУЛЬТУРА БЕЗПЕКИ ЯК ОСНОВА УПРАВЛІННЯ РИЗИКАМИ В ЗАЛІЗНИЧНИХ КОМПАНІЯХ

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The functioning of railway transport as a critical element of the national and global transport system is characterized by a high level of technological complexity, a multi-level organizational structure and significant dependence on the coordination of human, technical and digital components. In such conditions, ensuring the safety of the transportation process cannot be considered exclusively through the prism of the technical reliability of the infrastructure or formalized risk management procedures, since the key determinant of the system's stability is the safety culture as an integrated set of values, norms of behavior and management practices that determine the priority of safety at all levels of the organization.

In general, safety culture is considered as a set of organizational values, behavioral norms, management approaches and institutional mechanisms that determine the level of priority of safety in the processes of functioning and development of socio-economic systems. This category reflects the degree of integration of safety principles into the management decision-making system, the level of awareness of potential risks by personnel and the ability of the organization to provide a preventive response to internal and external threats. It

should be taken into account that safety culture encompasses not only formalized regulations and control procedures, but also behavioral practices, communication models, the level of employee responsibility and the nature of interaction between individual elements of the organizational system, acting as one of the key intangible factors ensuring the stability, adaptability and efficiency of organizations in the face of growing technological complexity, digitalization and increased systemic risks.

In the railway industry itself, safety culture should be considered from the perspective of an integrated system of corporate values, behavioral norms, management practices and organizational mechanisms aimed at forming the priority of safety in the decision-making process and the implementation of production activities. One of its key components is the level of awareness of potential risks by personnel, readiness for preventive response to threats and the ability of the organization to ensure continuous improvement of safety processes, which defines it as a complex characteristic of the organizational environment, which reflects the effectiveness of the functioning of the risk management system of railway transport enterprises. Given the specificity of this industry and the complexity of its management system, it should be taken into account that the safety culture in railway companies is formed as a result of the interaction of institutional regulations, corporate policy and behavioral models of personnel, which together determine the level of the organization's tendency to prevent or reproduce risk situations. Unlike traditional approaches to safety management, which are based mainly on reactive elimination of the consequences of incidents, the safety culture concept provides for a proactive risk management model focused on the formation of preventive behavior and minimizing the likelihood of critical events.

Research in the field of railway transport shows that a significant proportion of incidents and accidents are not related to technical failures of the infrastructure, but to the human factor, including decision-making errors, violations of operating regulations, insufficient level of communication between participants in the transportation process and incoherence of actions in crisis situations [1-2]. This confirms that increasing the level of safety in the railway industry is impossible without the systematic development of organizational culture and integration of safety principles into everyday operational activities.

In the leading railway systems of Europe and Asia, safety culture is considered as a basic element of strategic risk management. In particular, in the practice of such operators as Deutsche Bahn and SNCF, the concepts of “Vision Zero” and continuous risk monitoring systems are being implemented, which combine technological solutions with organizational mechanisms of personnel responsibility. In these models, safety is treated not as an isolated function, but as an integrated property of the entire organizational system, covering management decisions, production processes and behavioral practices of

employees. The further development of these approaches is characterized by the transition from a regulatory-reactive model of ensuring safety to a risk-oriented and data-driven management paradigm, within which not only incident recording but also their preventive detection based on the analysis of large arrays of operational data, the use of predictive analytics and technologies of digital twins of infrastructure acquires priority. However, within the framework of the "Vision Zero" concept, the institutionalization of security responsibility at all levels of the management hierarchy is strengthened, which involves a combination of formalized regulations with the formation of sustainable behavioral practices focused on proactively identifying potential threats. An important element is the internal audit and feedback systems that ensure continuous updating of risk profiles and adaptation of management decisions to changes in the operating environment.

In addition, the digitalization of rail transport and the introduction of intelligent traffic management systems form a new class of cyber-physical risks that arise at the intersection of automated dispatch systems, sensor networks and centralized digital platforms. This leads to the expansion of the content of the safety culture concept to an integrated "safety & cyber safety culture", within which safety assurance covers both classic operational risks and cyber threats associated with the violation of the integrity, availability and reliability of digital control systems. That is, it can be argued that modern European and Asian models of railway safety management demonstrate a transition to a complex, multi-level and digitally-oriented risk management architecture, in which the safety culture plays the role of an integrating mechanism between technological innovations, organizational practices and strategic goals of ensuring the sustainability of transport systems.

It should also be emphasized that the current stage of railway transport development, characterized by the digitalization of management processes and the introduction of intelligent transport systems, significantly transforms the nature of risks. Along with traditional operational threats, the importance of cyber-physical risks associated with the operation of automated traffic control systems, digital dispatching platforms, Internet of Things technologies and predictive analytics is growing. In these conditions, safety culture acquires an additional dimension, including not only the classic aspects of occupational health and safety, but also the cybersecurity component as an integral part of the overall risk management system.

Structurally, safety culture in railway companies can be represented at three interrelated levels. The strategic level defines the overall safety policy and its priority in the corporate governance system and investment decisions. The tactical level covers the implementation of risk management procedures, monitoring and control systems, as well as incident response mechanisms. The operational level reflects the direct behavioral practices of employees, the level

of compliance with regulations and the effectiveness of communication in the process of performing production tasks.

Thus, safety culture acts as a system-forming element of risk management in railway companies, ensuring the transition from a reactive model of incident management to a proactive model of their prevention. Its development is a key prerequisite for increasing the resilience of railway infrastructure in the face of growing technological complexity, digital transformation and increased external and internal risks to the functioning of transport systems.

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RISK MANAGEMENT IN LOGISTICS SYSTEMS

РИЗИК-МЕНЕДЖМЕНТ В ЛОГІСТИЧНИХ СИСТЕМАХ

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In modern economic conditions, logistics systems play a crucial role in ensuring the efficiency and competitiveness of organizations [1, 4, 8]. The increasing complexity of supply chains, globalization, and rapid technological development have significantly intensified the exposure of logistics systems to various risks [2]. As a result, risk management has become an essential component of logistics management, aimed at minimizing disruptions and ensuring the stability of operations.

Logistics systems encompass a wide range of activities, including procurement, transportation, warehousing, inventory management, and distribution [3, 6]. Each of these elements is vulnerable to different types of risks, such as supply disruptions, transportation delays, demand variability, and operational failures [5]. Additionally, external factors such as political instability, economic fluctuations, environmental disasters, and technological failures further increase uncertainty within logistics systems.

Risk management in logistics involves the systematic identification,

Зміст

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