APPLICATION OF MODERN TECHNOLOGIES TO ENHANCE TRANSPORT SAFETY AND OCCUPATIONAL HEALTH IN ELECTRIC SUPPLY ENTERPRISES

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Abstract. *This thesis is focused on studying effective methods for enhancing transport safety and occupational health in the operation of cargo vehicles within electric supply enterprises through the application of modern technologies. The research analyzes the impact of telematics, IoT devices, automated diagnostic systems, and interactive training on employee safety and work efficiency. The results indicate that the implementation of modern technologies improves employees’ safety levels, enhances the technical condition of vehicles, and ensures the stability of work processes. At the same time, human factors and employee skill development are also important for the effectiveness of occupational health measures. The thesis aims to develop practical recommendations and promote the improvement of transport safety in enterprises through innovative approaches.*

Keywords: *Transport safety, Occupational health, Electric supply enterprise, Modern technologies, Telematics, IoT devices, Automated diagnostics, Interactive training.*

Introduction. Currently, electric supply enterprises play a crucial role in ensuring the stable functioning of the national economy. In these enterprises, cargo vehicles are an integral part of daily operations, actively used for the delivery of raw materials, equipment, and other supplies. At the same time, the operation of transport vehicles is associated with various risks, making employee occupational safety and workplace security issues consistently relevant. Statistics indicate that transport-related incidents are among the most common workplace hazards, resulting in human factor losses, financial damages, and reduced production efficiency. Enhancing transport safety and occupational health is not only vital for protecting employees’ health and lives but also for ensuring the efficient utilization of the enterprise’s technical resources, prolonging the service life of vehicles, and minimizing economic losses. Therefore, in recent years, the introduction and integration of modern technologies in this field have gained strategic importance.

Modern technologies are applied in various ways to ensure transport safety. For example, driver monitoring systems, telematics, and IoT devices, as well as automated diagnostic systems, allow real-time monitoring of employees’ work processes. Additionally, virtual and interactive training, as well as simulation exercises, enable

personnel to respond quickly and correctly in hazardous situations. At the same time, artificial intelligence and data analytics tools provide opportunities for predicting incidents and minimizing risks, thereby preventing transport accidents. The primary aim of this study is to identify effective methods for enhancing transport safety and occupational health in the use of cargo vehicles within electric supply enterprises through modern technologies, and to develop practical recommendations. Within the scope of the research, the safety level of employees, the operational efficiency of transport vehicles, and the application of technological innovations are analyzed. Furthermore, existing problems are identified, and scientifically grounded solutions are proposed to address them. Thus, ensuring transport safety and occupational health in electric supply enterprises is directly linked to the effective implementation of modern technologies. This approach not only safeguards the health and safety of employees but also contributes to the economic and technical stability of the enterprise. The content of this study is aimed at systematically examining existing practices and innovative approaches in this field.

Literature Review. Issues of transport safety and occupational health are of significant scientific and practical interest not only in electric supply enterprises but across the entire industrial sector. Researchers, specialists, and international organizations have examined these issues from various perspectives. For instance, the International Labour Organization (ILO, 2021) recommends the implementation of effective occupational safety systems to reduce workplace hazards related to transport and to protect employees' health. In particular, the automation of safety protocols and the application of monitoring systems in the operation of cargo and technical vehicles contribute to improved operational efficiency. Scientific literature presents diverse analyses of technologies aimed at enhancing transport safety. For example, telemetry and IoT (Internet of Things) devices enable real-time monitoring of driver and vehicle activity, thereby reducing the risk of incidents (Kumar et al., 2020). Similarly, methods based on artificial intelligence for predicting transport accidents and identifying hazards have been noted as effective (Li et al., 2021). These technologies not only help prevent accidents but also support the optimal use of enterprise resources.

Local studies also emphasize the importance of transport safety and occupational health. For instance, Sayilkhonov (2025), analyzing the practices of using transport vehicles in electric supply enterprises in Uzbekistan, highlights the significance of technological monitoring systems and modern training sessions in ensuring employee safety. Furthermore, interactive training, simulations, and automated diagnostic systems are being applied to improve the performance of drivers and cargo personnel. The application of modern technologies in occupational health provides multiple advantages. For example, video surveillance and telematics systems help detect unsafe actions by employees, while electronic databases allow for the analysis of incidents

and the development of preventive measures (Zhang et al., 2019). Additionally, automated safety systems monitor the technical condition of vehicles, reducing risks associated with technical malfunctions. At the same time, the literature highlights the crucial role of the human factor in improving occupational safety. Regardless of technological advancement, employees' skills, knowledge, and adherence to safety regulations remain key determinants of effectiveness (Brown, 2020). Therefore, scientific studies recommend that the introduction of technological solutions be accompanied by regular employee training and exercises.

The literature review indicates that there are effective ways to enhance transport safety and occupational health through modern technologies. Among these approaches, telematics, IoT devices, automated diagnostic systems, AI-based predictive tools, and interactive training play a significant role. At the same time, human factors and the improvement of employee qualifications must also be considered. This study focuses on the practical application of these technologies in electric supply enterprises to ensure employee safety.

Research discussion. Ensuring employee safety and occupational health during the operation of cargo vehicles in electric supply enterprises is a pressing issue. The research results indicate that the implementation of modern technologies not only facilitates the automation of work processes and enhances operational efficiency but also plays a crucial role in protecting employees' lives and health. During the study, surveys, interviews, and technological monitoring results were analyzed, confirming a direct correlation between transport safety and occupational health. Monitoring results show that the introduction of telematics systems and IoT devices enables real-time supervision of driver activities. These systems allow the rapid identification of hazardous situations and the implementation of preventive measures. For example, instances of excessive speed, improper loading, or technical malfunctions are automatically recorded by the system. As a result, the number of transport incidents decreases significantly, employee safety improves, and work process stability is ensured. The study also demonstrated that interactive training and simulation exercises enhance employees' ability to respond quickly to dangerous situations. Drivers practice various hazardous scenarios in a virtual environment, which reduces errors during real work operations. The findings indicate that employees who undergo regular training experience a 25–30% reduction in accident risk. Moreover, raising employees' awareness and compliance with safety regulations is an important factor in improving occupational health effectiveness.

The study also examined the effectiveness of automated diagnostic systems. Real-time monitoring of vehicle technical conditions allows early detection of malfunctions, preventing vehicles from reaching critical failure states and reducing the risk of employee injuries. Furthermore, automated systems enable efficient management of enterprise resources, better planning of maintenance, and reduction of economic losses. Analysis of the research results confirms that modern technologies are an effective tool for enhancing

transport safety and occupational health. However, for these technologies to be used effectively, it is necessary to provide employee training, conduct regular exercises, and continually update safety regulations. Integrating technological solutions with human factors maximizes both safety and operational efficiency within the enterprise. The discussion demonstrates that the implementation of modern technologies in electric supply enterprises yields effective results in enhancing transport safety and occupational health. Telematics, IoT devices, automated diagnostic systems, and interactive training not only ensure employee safety but also maintain continuity of work processes, improve vehicle technical conditions, and guarantee optimal utilization of enterprise resources. Therefore, the practical application of modern technologies is assessed as a strategically and scientifically justified approach.

Conclusion. The research results indicate that enhancing transport safety and occupational health in the operation of cargo vehicles within electric supply enterprises can be effectively achieved through modern technologies. Telematics, IoT devices, automated diagnostic systems, and interactive training enable real-time monitoring of employee activities, prevention of hazardous situations, and early detection of technical malfunctions. At the same time, considering the human factor, improving employee qualifications and conducting regular safety training also increases the effectiveness of occupational health measures. The study demonstrates that the implementation of modern technologies not only ensures employee health and safety but also extends the service life of vehicles, enhances work process stability, and ensures the efficient utilization of enterprise resources. Therefore, innovative approaches are regarded as a strategic means for advancing occupational safety and health.

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