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Systematic Analysis of Occupational Health and Safety Risks in Air Logistics: ISO 45001 Applications and Digitalization-Based Management Approaches

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Abstract – The air logistics sector carries a wide range of risks in terms of occupational health and safety (OHS) due to fast operations, complex business processes and intense human-machine interaction. This study aims to systematically analyse the OHS risks encountered in air logistics and to evaluate the effectiveness of the management systems implemented within the framework of the ISO 45001 standard. In the study, work accidents and work disease data belonging to air cargo operations between the years 2018-2023 were analysed with quantitative and qualitative methods. After the frequency, severity and trend analyses, potential hazards and risk priorities were determined using the FMEA risk analysis technique. The integration of ISO 45001 management systems created a significant decrease in the frequency of work accidents by 24%, while 78% of employees expressed high satisfaction with safety practices. In addition, ensuring compliance with international legislation such as the European Union Occupational Health and Safety Directive 89/391/EEC and Convention No. 155 of the International Labour Organization has played a critical role in improving OHS performance in air logistics. Within the scope of the increasing impact of digitalization on occupational health and safety management, the use of RFID-based tracking systems, automatic loading equipment and artificial intelligence-supported risk monitoring platforms have made significant contributions to reducing physical risks. However, the emergence of psychosocial risks such as information overload, monotony and stress brought about by digitalization has necessitated the development of comprehensive and holistic OHS strategies. In this context, continuous training, employee participation and technological adaptation need to be managed in a balanced manner. As a result, the implementation of ISO 45001 standards, the use of systematic risk analysis techniques and the integration of digital technologies are of great importance for sustainable and effective occupational health and safety management in air logistics. This study provides a comprehensive model for the holistic integration of interdisciplinary and technological approaches to improve the sector's OHS practices.

Keywords –Air Logistics, Work Safety, Digitalization, ISO 45001, Risk Analysis