

## Doctoral dissertation abstract

### „Management of ergonomic quality in enterprise logistics”

In the era of rapid changes resulting from technological progress, one of the areas affected is industry and the logistics that accompany it. Changes in industry, production methods and related business processes force changes in logistics and supply chain management, requiring them to adapt and optimize the implementation of tasks. This resulted in the creation of the term Logistics 4.0 (also known as Smart Logistics). Researchers also note another industrial revolution, where in Industry and Logistics 5.0 more and more attention is paid to the employee and their well-being. This results, among other things, from the deficits of human resources. At the same time, people and their health, quality of life and work, are the subject of research by many international organizations, which is associated with the level of development of countries.

It was noted that not only taking care of safety, but also psychophysical comfort is essential to ensure employee health. An essential tool for this is, among others, the occupational risk assessment required by law for employers, an element of which should be an ergonomic assessment. However, in the case of logistics, it was noted that the role of ergonomics management is marginalized. This mainly concerns positions other than those related to internal logistics of enterprises. Also, the role of management staff in taking care of the appropriate ergonomic quality, and above all their awareness in this area, is not taken into account in the studies. This became an impulse to take up the presented topic.

The main objective of the research was to determine the role of ergonomic quality management in the logistics of enterprises. The state of knowledge in the subject area was determined based on a literature review. The current state of knowledge in the field of management and quality sciences turned out to be incomplete in the context of the issues considered. A number of research gaps (theoretical and empirical) were identified, the filling of which became necessary in the face of the development of scientific knowledge. Attention was also drawn to the possibility of practical use of an appropriate approach to ergonomic assessment and the role of management staff awareness in order to improve the level of ergonomic quality. On this basis, the following research questions were formulated:

Q1. What roles do employees play in the logistics activities of enterprises?

Q2. What features are required of employees in the logistics activities of enterprises?

Q3. What are the relationships between ergonomics and safety, ergonomics and employee well-being, and safety and employee well-being?

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Q4. What requirements or types of requirements should be considered when making an ergonomic assessment?

Q5. What methods and tools are recommended for ergonomic assessment in logistics?

Q6. What methods and tools are used for ergonomic assessment in logistics?

Q7. What factors (hazards) should be or are considered in ergonomic assessment in logistics positions according to management staff?

Q8. What methods and tools should be or are used in ergonomic assessment in logistics positions according to management staff?

Q9. What requirements or what types of requirements should be considered when conducting ergonomic assessment in logistics positions according to management staff?

Q10. How to select factors (hazards) assessed during ergonomic assessment in logistics?

Q11. How to select methods and tools used for ergonomic assessment in logistics?

In order to answer the research questions and to achieve the six related detailed objectives, a literature review, case study and expert panel were used. The case study included interviews with members of the management staff of logistics and manufacturing companies with developed logistics activities, territorially related to the Łódź Voivodeship, and an analysis of documents from these companies. The experts who participated in the second part of the study are experienced practitioners or researchers dealing with ergonomics in positions related to the groups of logistics positions identified in the dissertation (employees of universities, the Institute of Occupational Medicine, ergonomicians, experienced employees of occupational health and safety services).

The structure of the doctoral dissertation reflects the order and logic of the work carried out. The first chapter presents a general outline of the essence of ergonomics and the subject of ergonomic research, with which the work is closely related. The issues of ergonomic quality, quality of life and work are also discussed. Deficiencies in human resources are discussed, which should pay special attention to employee well-being. The second chapter contains explanations on the organization of logistics in micro- and macroeconomic terms, as well as the division of logistics positions into groups developed by the author of the dissertation, which is the basis for further theoretical considerations and empirical research. Threat factors for individual groups of positions are presented and the features that an employee of each group of positions must meet the requirements of the tasks performed are indicated. The third chapter discusses the importance of using an ergonomic approach due to legal conditions and health effects for employees in the form of occupational diseases. A number of requirements for the use of ergonomic assessment methods and tools in the author's division are presented, as well as methods and tools for assessing ergonomics at workstations that are cited as used or recommended in logistics activities. Chapter four describes the empirical research

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methodology, including the selection of research samples, developed tools and their structure. Chapter five describes the research results and the conclusions and recommendations regarding the selection of assessed factors and methods and tools for ergonomic assessment in logistics. The conclusion includes a summary of the answers to the research questions and the degree of achievement of the work objectives. The limitations of the conducted research are presented and recommendations, and possible directions for further work are indicated.

The identified limitations may also constitute recommendations for further research. This work may contribute to the understanding of the phenomena occurring concerning the management of ergonomic quality of work in enterprise logistics and to the development of knowledge helpful in its management.

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