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Occupational Health and Safety Assessment. Case Study

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Abstract
Technological progress throughout the twentieth century accelerated industrial growth but also introduced significant occupational risks, making workplace safety a critical concern for organizations. Occupational health and safety (OHS) practices aim to protect employees, enhance organizational performance, and reduce the costs associated with accidents and illnesses. Risk assessment has emerged as a cornerstone of OHS management, enabling companies to identify, evaluate, and control hazards before incidents occur. This study emphasizes the dynamic and systematic nature of risk assessment, which requires continuous monitoring, updating, and integration with prevention programs, operator training, and emergency planning. A case study on industrial process highlights the identification of 68 specific risk factors, with operator-related hazards representing the greatest proportion. While the overall safety level indicates a high degree of security, unacceptable risks remain, necessitating stricter preventive measures. Ultimately, risk assessment functions not only as a legal obligation but also as a strategic tool for fostering sustainable safety cultures.

Keywords
occupational health and safety, risk factors, level of security, improving working environment conditions, workplace accidents minimization.

1. Introduction

During the twentieth century, technological progress brought heightened risks, compelling companies to place greater emphasis on minimizing workplace injuries and illnesses. As a result, safety management has evolved into a key discipline within the business environment.

Workplace health and safety practices are essential to safeguarding both employees and organizational performance. Weak or poorly designed policies in this area can negatively impact the workforce as well as the firm itself [1]. While the principles of occupational health and safety are universally relevant, the specific measures required often depend on factors such as organizational size, operational hazards, workplace culture, the nature of products or services, and the effectiveness of existing systems.

The industrial revolution marked a pivotal turning point in the history of manufacturing, as the introduction of mechanized production gradually displaced traditional forms of manual labor. This technological shift not only enhanced productivity, but also facilitated the establishment of large-scale factories, where work was organized through hierarchical supervision and a systematic division of labor. While these developments contributed significantly to economic growth and industrial efficiency, they also introduced new social and labor challenges, including monotonous tasks, extended working hours, and heightened safety risks. Consequently, the factory system became both a driver of industrial progress and a source of debates concerning operators' rights, health, and overall well-being.

Occupational health and safety is currently one of the most important and developed aspects of EU employment and social policy [2]. The adoption and application, in recent years, of a large body of Community legislation has allowed the improvement of working conditions in the EU Member States and considerable progress has been made in reducing accidents at work and occupational diseases.

Occupational risk assessment is a tool that demonstrates the application of the principles of prevention at the level of any organization. This means that any company must anticipate the dangers that may lead to accidents at work or occupational diseases, instead of reacting after such events have occurred [3]. An essential step in implementing a responsible approach to occupational safety and health is the assessment of occupational risks [4].

Risk assessment is a fundamental process of the occupational safety and health management system, with the main objective of identifying, analyzing and controlling the risk factors that may lead to accidents at work or occupational diseases [5]. This constitutes the basis for defining and implementing preventive and corrective measures, ensuring compliance with the requirements of national legislation and European regulations in the field.

Correct risk management involves continuous monitoring of hazardous factors, implementation and verification of technical and organizational security measures, documentation of the results obtained and maintenance of updated records. At the same time, the assessment process must be correlated with operator training, emergency response plans and internal occupational health and safety audits, to ensure an efficient and integrated control system.

In this way, risk assessment becomes not only a legal obligation, but also a strategic management tool, which contributes to reducing the costs generated by accidents and illnesses, increasing productivity and developing an organizational culture oriented towards prevention and responsibility.

2. Occupational Health and Safety Assessment

Occupational risk assessment must cover each activity and each workstation in an enterprise, taking into account each component of the work system, namely the operator, the work task, the work equipment and the work environment. Risk assessment serves to continuously improve working conditions and, for this purpose, requires adequate and sustained documentation.

The assessment process has a systematic and dynamic nature, integrating stages such as: identifying hazards, estimating the probability of occurrence and the severity of the consequences, determining the level of risk, establishing prevention and protection measures, as well as monitoring their effectiveness. Depending on the changes that have occurred in the technological processes, equipment, substances used or in the organization of work, the assessment must be reviewed and updated periodically, to reflect the new risk conditions.

The starting point in optimizing the prevention of occupational accidents and diseases in a system is the assessment of the risks in that system.

The purpose of assessing the risk/security level is to provide the possibility of knowing the real situation at each workplace from the point of view of safety and health and to effectively take the necessary measures to prevent work accidents and implicitly to eliminate all expenses related to their occurrence (Figure 1).

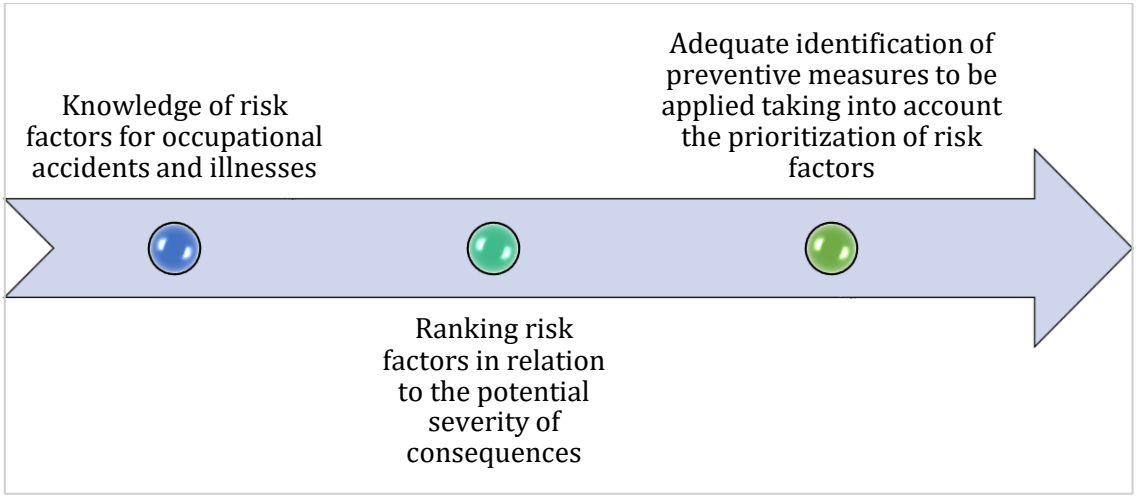

Fig. 1. Premises of risk level assessment

In the work process, the objective of protecting people consists in eliminating and/or controlling the risks of occupational accidents and illnesses specific to the activity carried out, which ends with the adoption of specific measures. Therefore, it is necessary to develop and implement action programs, consisting of all occupational safety and health measures in order to eliminate and/or reduce risks, measures that are established and implemented correctly only following a risk assessment process.

Prevention activity represents a set of procedures and measures taken or planned at all stages of conception, design and implementation of work processes and is intended to ensure the implementation of work processes in conditions of maximum security for the health and integrity of the participants in the process. From the above, the two major objectives of prevention arise to:

- Human level: reducing the number of occupational accidents and illnesses;
- Organizational level: reducing the costs related to occupational accidents and illnesses.

These goals can only be achieved by eliminating or reducing occupational risks. To this end, a global approach is being undertaken, illustrated in Figure 2.

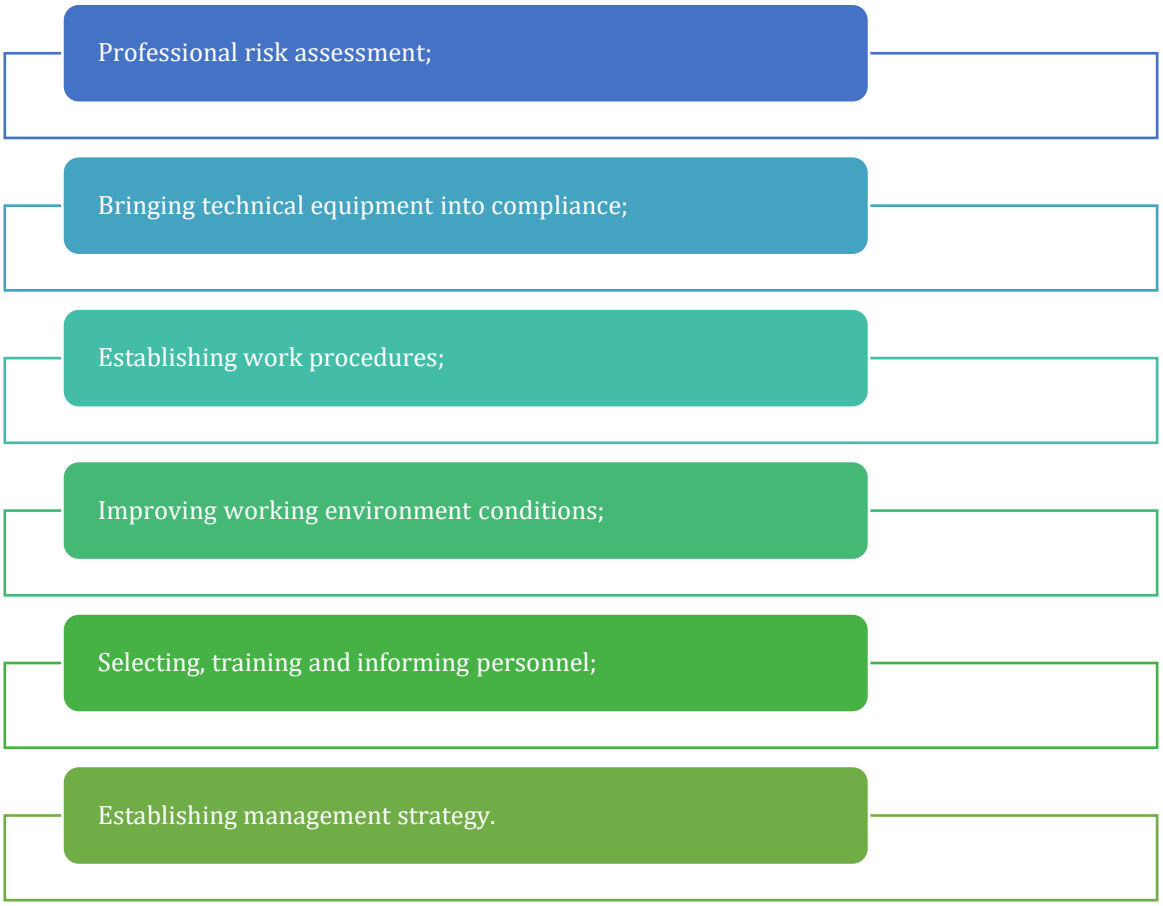

Fig. 2. Occupational health and safety management

3. Occupational Health and Safety Assessment. Case Study

The case study refers to the assessment of risk factors specific to the galvanizing operation, an operation that involves the application of a thin layer of zinc on the surface of objects, in order to protect them against corrosion or to give them a decorative appearance.

In order to galvanize, the products are subjected to a very careful preparation of the surfaces that differ depending on the manufacturing series and the equipment used. Additionally, the activities involve defective working positions or repetitive work.

The stages of occupational risk assessment consist of:

- Identification of all hazards at the workplace;
- Identification of all persons exposed to hazards;

- Risk estimation;
- Establishment of prevention and protection measures;
- Establishment of priorities for prevention and protection measures.

The main characteristics of the method are:

- Quantitative determination of the level of risk/safety;
- Degree of generalization and application;
- Improvement of working conditions in terms of occupational safety;
- Involvement of all components of the work system.

Risk factors specific to the components of the work system are presented graphically in Figures 3 to 6.

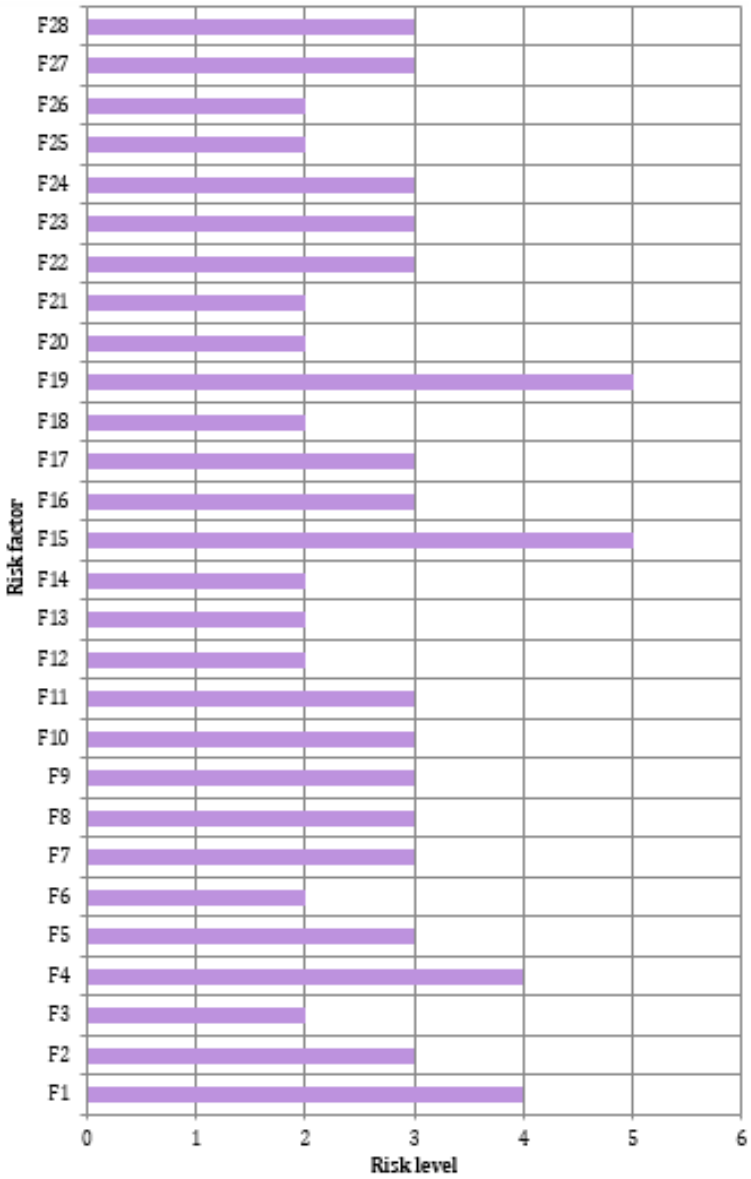

Fig. 3. Operators risk factors

A total of 68 risk factors were identified. Following the qualitative assessment, the overall risk level signifies a high level of security (Nrg = 2.33). It can be observed that some risk factors exceed the imposed limit. These risk factors refer to: execution of erroneous orders in the work process resulting in injury to participants in the activities carried out; electrocution due to interventions on electrical equipment, without having the necessary training and knowledge; travel, parking in dangerous areas (under the load of lifting equipment, on car access roads, etc.); static effort, working in vicious positions;

large volume of work correlated with intense static effort; galvanizing baths are not thermally insulated; failure to comply with work instructions by operators.

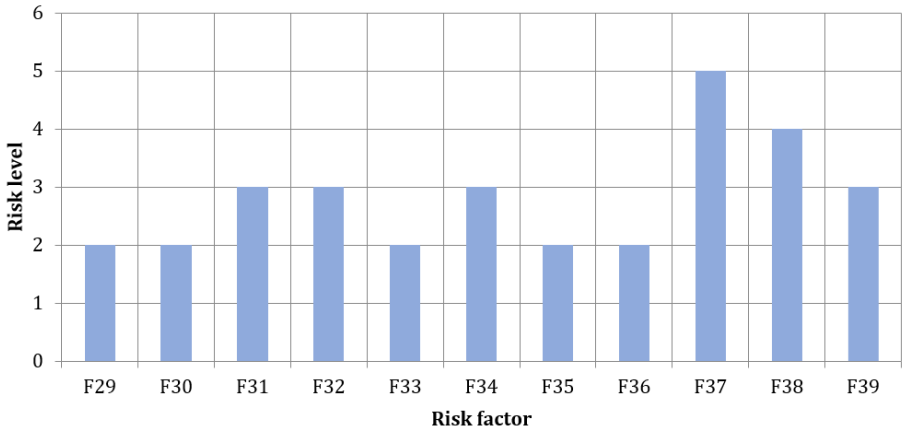

Fig. 4. Risk factors specific to the work place

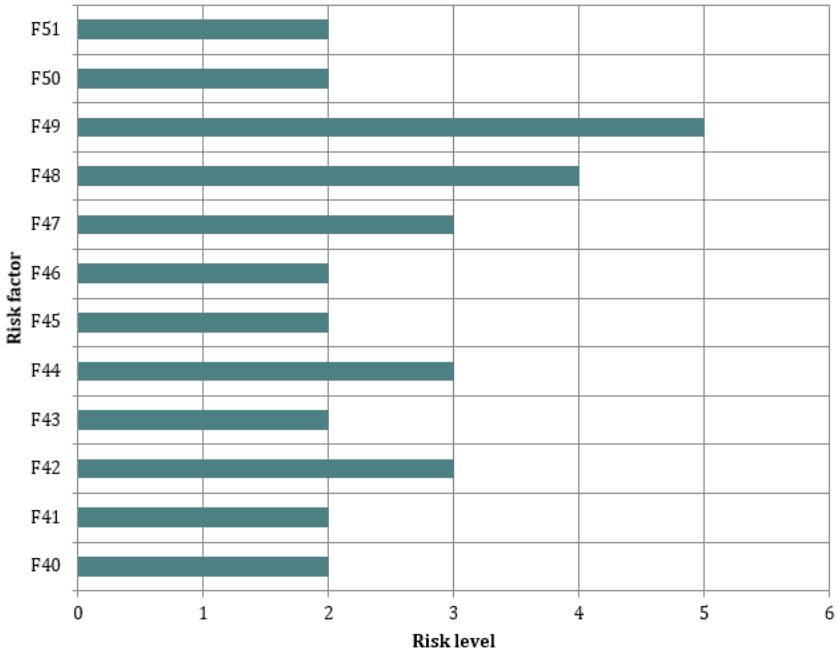

Fig. 5. Risk factors specific to production means

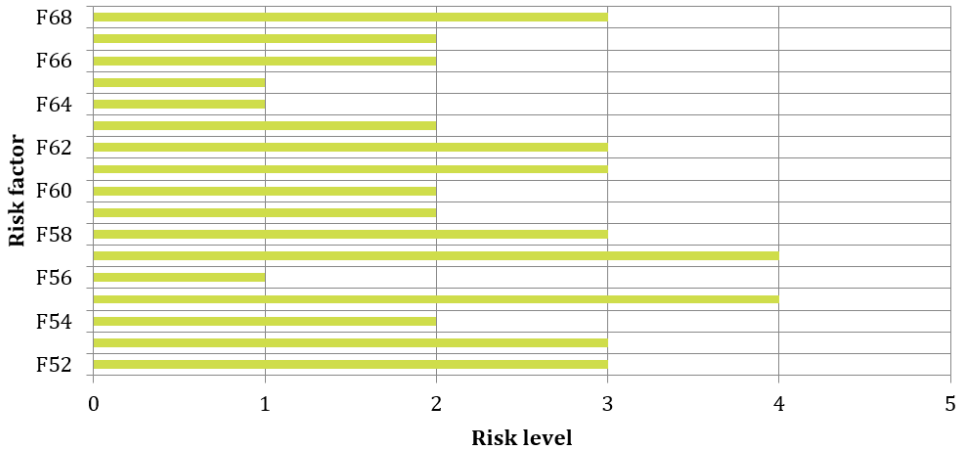

Fig. 6. Risk factors specific to the workload

In the case of the operator' assessment, as in the case of the other components of the work system, the risk acceptability curve allows the differentiation between acceptable and unacceptable risk (Figure 7).

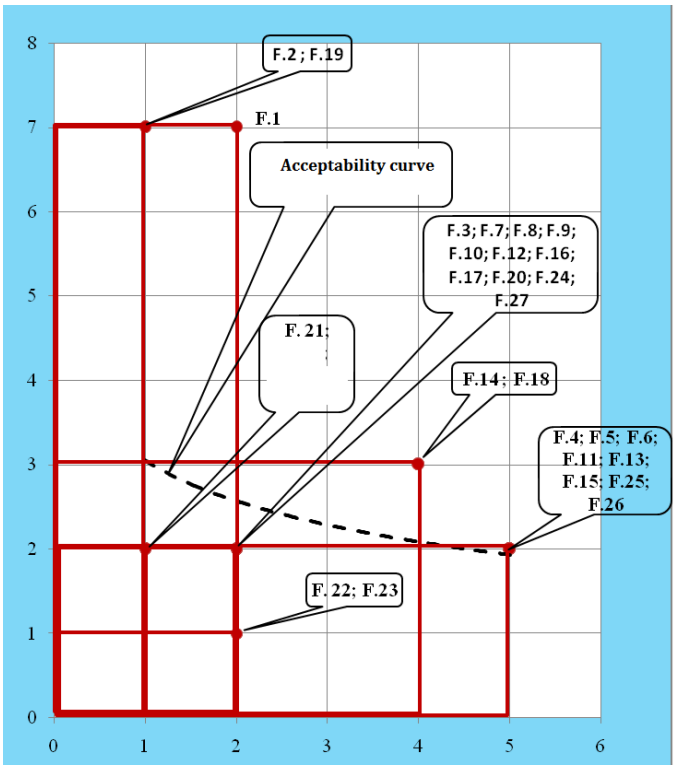

Fig. 7. Operators' security level

The individual analysis of each component of the work system highlights a weight of 44% for the factors specific to the operators, 21% for the factors specific to the work environment, 20% factors specific to the means of production and 15% factors specific to the work task. The highest weight is recorded for the performer, this being justified due to the fact that it is a special process.

4. Conclusions

Risk assessment is an essential tool for reducing and preventing work-related accidents and occupational diseases, representing the foundation on which an effective management of occupational safety and health is built. This is not just a simple formality, but a continuous and dynamic process, through which organizations, regardless of their field of activity, can systematically identify existing risk factors, analyze the degree of associated danger and adopt proactive measures aimed at eliminating or reducing their consequences.

Correct risk management involves, in addition to their identification and classification, monitoring permanent measures of working conditions, rigorous control of their implemented protection, as well as periodic verification of their effectiveness. The assessment must also be documented, in order to constitute a solid basis for decision-making regarding the planning of future measures. The process does not end with the first assessment; it requires regular updates, so as to constantly reflect the changes that have occurred within the organization, whether it is the introduction of new technologies, changes in workflows or the emergence of new legal regulations.

Thus, the assessment becomes a mechanism for increasing ongoing risks, but also for developing an organizational culture focused on responsibility, safety and health at work.

The level of risk for the assessment activities of the work process allows for safe working conditions. In the existing situation, it is necessary to intensify the responsibility factors for the implementation, compliance and improvement of the recommendations proposed for each activity, and the legal provisions in force for the assessed activities.

References

1. Samarasinghe H., Heenatigala S. (2024): *Insights from the field: A comprehensive analysis of industrial accidents in plants and strategies for enhanced workplace safety*. Open Journal of Safety Science and Technology, ISSN 2162-5999, Vol. 14, is. 1, pp. 1-16, https://doi.org/10.4236/ojsst.2024.141001
2. https://ec.europa.eu. Accessed: 2025-07-28
3. Flavio J., Coelho G.M., Moy D. (2003): *The new performance evaluation methodology and its integration with management systems*. The TQM Magazine, ISSN 0954-478X, Vol. 15, is. 1, pp. 25-29, https://doi.org/10.1108/09544780310454411
4. Dumitrascu A.-E., Dumitrascu D.-I. (2016): *Risks evaluation of occupational health and safety in accordance with OHSAS 18001:2007 in educational domain*. Proceedings of 5th EEM International Conference on Education Science and Social Science, Advances in Education Research, ISSN 2160-1070, pp. 255-259, Sydney, Australia
5. Mixafenti S., Moutzouri A., Karagkouni A., Sartzetaki M., Dimitriou D. (2025): *Assessment of occupational health and safety management: Implications for corporate performance in the secondary sector*. Safety, ISSN 2313-576X, Vol. 11, is. 44, pp. 1-27, https://doi.org/10.3390/safety11020044

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