

EXAMINATION OF THE OCCUPATIONAL SAFETY REGULATIONS OF A COMPLEX EDUCATIONAL INSTITUTION AND PROPOSAL FOR A NEW, COMPREHENSIVE OCCUPATIONAL SAFETY SYSTEM

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Abstract

This study examines the occupational safety regulatory framework of a complex higher education institution and proposes a new, modular, multi-level occupational safety system. The existing regulation, adopted in 2018, was evaluated by a four-member working group using an assessment criteria system of 259 criteria grouped into seven categories. The analysis revealed deficiencies in several areas, most critically in the storage and registration of hazardous materials in research laboratories. Based on the findings, a three-level modular occupational safety system is proposed: a general regulatory level applicable to all units, sector-specific modules addressing the distinct requirements of laboratories, workshops, and offices, and unit-specific supplements. The proposed system incorporates restructured training programmes, customised personal protective equipment management, ergonomic workplace design, and mental health support measures. The new framework ensures continuous adaptation to organisational changes and emerging hazards while maintaining full compliance with Hungarian legal requirements.

Keywords: *optimized EHS, complex institution, occupational safety regulations, workplace safety*

1. Introduction

In the case of a large-scale organization, reorganization among organizational units affects its operation in multiple aspects. Primarily, there is a need for review of previous management models and areas of responsibility, as different principles, objectives, and workflows apply in the new system. This impacts the regulation of occupational safety and the redistribution of occupational safety responsibilities, as the creation of a safe and healthy work environment is crucial for all organizational units and forms the foundation of efficient operation.

Amid rapid changes, there is a particularly great need for thorough review and renewal of occupational safety rules and guidelines. In the transforming organizational system, new roles and responsibility boundaries emerge, which also affect the applicability and effectiveness of occupational safety rules. For

example, the occupational safety requirements for workers in physical positions differ from those in office or administrative organizational units, as the use, storage, and safe handling of chemical substances, as well as the properties and conditions of use of work equipment, play an emphasized role here. Additionally, for instance, the use of laboratory and experimental equipment may require stricter regulation.

To analyze the occupational safety challenges of organizational changes introduced at the examined organization, it was necessary to develop a detailed examination criteria system that takes into account the specificities and risk factors of individual organizational units. In order to achieve the most complete occupational safety compliance, a 4-member working group was established in 2021 to examine the adequacy of the occupational safety regulations issued in 2018 for the current organizational units. After refining the initial several hundred examination criteria, we analyzed the compliance of organizational units according to 31 aspects. During the analysis, we identified deficiencies in several areas, among which the proper storage and registration of hazardous materials and chemicals is particularly important, especially in research laboratories, where improper handling of chemicals can pose serious health and safety risks. Through the already initiated comprehensive examination of current occupational safety practices and ensuring compliance with legal requirements, the organization's management can contribute to developing a new, more flexible, transparent, and safer occupational safety regulation.

During the modular modernization of occupational safety regulations, it must be taken into account that different organizational units operate under different conditions and face different risks. Therefore, a one-size-fits-all regulation is not sufficient; instead, a modular system must be created that can be flexibly adapted to the specific needs of individual units. This modular approach allows regulations to be updated and supplemented more easily as new challenges arise, while maintaining the basic principles and legal framework.

The proposed new occupational safety system is based on a three-level structure. The first level includes general regulations that apply to all organizational units, such as basic safety rules, emergency procedures, and general health and safety requirements. The second level contains sector-specific modules that take into account the special requirements of different areas, such as laboratory safety, workshop regulations, or office ergonomics. The third level includes unit-specific supplements that address the unique characteristics and risks of individual organizational units.

Implementation of this modular system requires close cooperation among all stakeholders. The occupational safety working group must work continuously with the leaders of organizational units to identify specific needs and risks. Regular training and awareness-raising are also essential so that all employees understand and apply the new regulations (Földházi, 2019). Furthermore, a continuous monitoring and evaluation system must be established to ensure the effectiveness of the new regulations and enable timely identification and correction of any deficiencies (Robson et al., 2007).

2. Regulations ensuring the functioning of the organisation

The organisation under review operates according to a system of internal regulations and instructions.

The regulations can be divided into two main groups:

- Basic documents (highlighting among them: Organisational and Operational Regulations Volume I Organisational and Operational Rules, Volume II Employment Requirements System, Volume IV Quality Assurance System, etc.);
- Other functional/specific regulations, in particular the Occupational Safety Regulations, which we will discuss in detail later.

3. Personal and material scope of the currently valid regulations

The current Regulation No. 110/2018 sets out the personal, material and organisational conditions for safe and healthy work, as well as the fulfilment of occupational safety and health requirements during organised work, and ensures the implementation of the organisational and procedural requirements necessary for their implementation.

The personal scope of the occupational safety regulations covers all employees of the institution and other persons in a legal relationship with it, as well as external contractors performing work and tenants using the organisation's facilities.

4. Possible safety-enhancing measures

The following list of possible safety improvement measures was discussed during consultations when the working group convened to review the adequacy of the occupational safety regulations discussed what incentives could be added to raise employee awareness of occupational safety, based on industrial and other successful examples.

4.1. Regular, comprehensive occupational safety training and awareness raising

Basic and advanced occupational safety training: Introductory training for new entrants should cover the most basic safety rules, the specific hazards associated with the job in question, and general accident prevention knowledge. The training should be tailored to the job role of the employee, and it is important that those exercising employer rights differentiate between the needs of new and more experienced employees.

Refresher and periodic training: Continuous training ensures that employees are aware of the current status of occupational safety rules, especially when new technologies, tools or materials are introduced.

Strengthening motivation and commitment: It is important that employees do not just passively participate in training, but feel the importance of occupational safety (Szabó, 2020). To this end, incentive schemes, such as rewards for accident-free months, can be introduced for manual workers to help maintain health and safety awareness.

4.2. Risk assessment processes, continuous analysis and risk management

Regularity and depth of risk assessment: Thorough and regular risk assessment helps to identify workplace hazards and their potential consequences. Targeted risk management plans provide an opportunity to minimise specific sources of accidents.

Use of preventive and predictive analyses: Modern risk assessment techniques make it possible to predict hazardous situations based on previous accidents. This approach is often supported by data-driven analysis, which enables data-based decision-making to improve workplace safety.

Monitoring future risks: Technological advances can also pose new types of hazards, so the risk assessment process needs to be reviewed from time to time to take into account the hazards associated with the use of new tools, methods and materials (NIOSH, 2017; EU OSHA, 2015). The heads of organisational units, project managers and implementers could become more actively involved in this process (which is currently somewhat passive).

4.3. Providing appropriate personal protective equipment, encouraging its use and monitoring it

Provision of customised protective equipment: In addition to general protective equipment, it is important that workers receive customised protective equipment that meets their individual needs and the specific requirements of their job (e.g. size, comfort considerations).

Training on the correct use of protective equipment: In many cases, problems arise from the incorrect use of personal protective equipment. Regular training of workers on how to wear and use protective equipment is essential for effectiveness.

Regular monitoring of protective equipment: Regular inspection and maintenance of protective equipment is crucial, as worn or damaged equipment does not provide adequate protection (Santos et al., 2025). Unfortunately, this issue is also financial in nature, which often affects the condition of personal protective equipment.

4.4. Establishing safe and optimised work processes

Ergonomic design of the working environment: From an occupational safety perspective, it is also beneficial to have an ergonomically designed working environment, as comfortable and customised working conditions can reduce the risk of accidents, such as musculoskeletal injuries.

Automation and robotisation: In the case of work processes with a high risk of accidents, automation and robotisation can play a significant role in improving occupational safety. This can be particularly important when handling hazardous materials or in jobs involving high physical exertion. Self-propelled, teachable floor cleaning machines will be tested on a trial basis (under personal supervision for the time being) on long corridors during the winter period.

Regulation of working hours and rest periods: Part of optimising work processes involves paying attention to adequate rest periods for employees. Tired or exhausted employees have a higher error rate, which can lead to an increased risk of accidents.

4.5. Regulation and regular safety checks

Introduction of strict inspection protocols: Regular inspections of strict occupational safety rules, for example through unannounced inspections or safety audits, can prevent serious accidents from occurring (Hale & Hovden, 1998).

Consistent handling of rule violations: When rules are broken, swift and consistent action is essential to maintain a culture of occupational safety. Employees need to know that compliance with the rules is not only an expectation but also a mandatory part of maintaining workplace safety.

Internal and external inspections and audits: In addition to internal inspections, it is sometimes worth involving external occupational safety experts who can provide advice based on more objective criteria and draw attention to any shortcomings. These are mainly used during major investments, e.g. complete building wing renovations and conversions.

4.6. Data collection, accident statistics and analyses

Creating an accident database: Recording and analysing data on previous accidents and injuries helps to identify the circumstances and situations that most often lead to accidents. This allows targeted prevention programmes to be developed.

Trend analysis: Trend analysis makes it possible to identify recurring problems and the most common causes of accidents, which is an important tool for preventive occupational safety.

Digital monitoring and analysis: Digital systems make it possible to collect and analyse real-time data, enabling occupational safety professionals to quickly identify potential risks and take action.

4.7. Mental health support and stress management

4.7.1. The purpose and importance of stress management training and programmes

The purpose of stress management training and mental health programmes is to help employees cope more easily with everyday workplace challenges, reduce workplace tensions and promote mental well-being (Leka et al., 2003).

4.7.2. Stress management programmes for office workers

The sources of workplace stress for office workers can often be traced back to the following:

- **Monotonous and often sedentary work:** Office work is often repetitive, requires little movement and is performed for long hours, which can lead to stress and physical and mental exhaustion.
- **Short deadlines and expanding responsibilities:** In office work, responsibilities often change rapidly, requiring constant adaptation and the rapid acquisition of new skills.
- **Communication problems:** Communication difficulties in the office environment, such as misunderstandings with colleagues or management, often lead to conflict, which also increases stress.
- **Teaching stress management and relaxation techniques:** Office workers are advised to learn relaxation techniques such as breathing exercises, short meditations, or muscle relaxation techniques that can be done quickly at their desks and can help relieve stress at work.

Exercise programmes and ergonomic workstations: Stress management programmes can also include support for exercise programmes, such as short daily exercises or the introduction of workplace fitness opportunities. In addition, ergonomic workstations reduce the negative effects of sedentary work. Unfortunately, our working group has identified several shortcomings in this area in the university's organisational units.

Communication training: In order to develop effective communication and conflict management, management can support communication and team-building training, which helps employees deal with workplace conflicts more effectively.

4.7.3. Stress management programmes for manual workers

For manual workers, the main sources of stress are often the following:

- **High physical exertion and monotony:** Manual workers often perform monotonous and strenuous work, which causes exhaustion and stress, especially when working long shifts.
- **Hazardous working environment:** Accident risks and hazardous working conditions are significant stress factors, as workers must constantly be aware of safety regulations.

Strict regulations and controls: Physical jobs are subject to strict regulations and controls, compliance with which often puts pressure on workers.

Programme suggestions for manual workers: Ensuring opportunities for physical and mental rest: During longer shifts, it is particularly important to schedule regular breaks to allow workers to recover physically and mentally.

Create rest rooms and relaxation areas or introduce shorter breaks:

- Developing mental stamina: Organised mental training for manual workers, such as stress management and attention training exercises, can help to increase concentration and safety awareness, especially in hazardous work processes.

Promoting a culture of safety: Training and support programmes that develop safety awareness and reduce accident risks are useful for manual workers.

4.8. Health problems caused by forced postures and ways to prevent them

Office workers, who typically spend long hours in front of computers, face a variety of occupational health challenges, particularly musculoskeletal injuries and eye problems. Common risks such as back pain, wrist pain and dry eyes are caused by uncomfortable posture, repetitive movements and prolonged viewing of screens. As a preventive measure, the working group discussed the possibility of recommending to management that employees be provided with an electronic summary of advice on maintaining correct posture during daily work and educating them on relaxation and other health-preserving techniques.

4.8.1. Common problems

Musculoskeletal disorders (MSDs):

Repetitive movements such as using a mouse and typing, as well as poor posture, often cause wrist and shoulder problems, carpal tunnel syndrome and back pain. These complaints can also result from constantly slouching and leaning the neck too far forward (EU-OSHA, 2007).

Eye Problems (Computer Vision Syndrome, CVS):

Eye strain and dryness are common among office workers, as prolonged focus on the monitor is accompanied by infrequent blinking. This can be exacerbated by the brightness of the screen and improper adjustment of the distance between the eyes and the screen.

4.8.2. Prevention methods

Ergonomic Workstation Design:

It is important to adjust the height of the chair and desk so that your posture is natural when sitting: your feet should be flat on the floor and your arms should be at a relaxed angle (NIOSH, 2017). Adjusting the monitor to eye level can also help reduce neck strain. Appropriate ergonomic tools, such as wrist rests, adjustable chairs and monitor stands, all contribute to a more comfortable working environment.

Regular breaks:

To reduce repetitive movements, it is recommended to take short breaks at regular intervals and switch to other tasks if possible. Following the so-called “20-20-20 rule”, which recommends focusing on a distant object for 20 seconds every 20 minutes, can help reduce eye strain.

Movement and stretching:

Regular stretching and short walks are recommended to relieve neck and shoulder tension. Incorporating stretching exercises and using a standing workstation during sedentary work can help reduce back and shoulder tension while improving overall comfort.

Eye Protection:

Reducing screen glare, for example with shades or glasses, can alleviate eye irritation. Proper colour and brightness settings and the use of screen filters can also help reduce eye strain.

5. Developing a set of assessment criteria

In order to assess the compliance of the current occupational safety regulations, our working group had to develop a suitable assessment criteria system.

At the beginning of our work in 2021, we started to compile guidelines for collecting criteria that would take into account the different tasks and circumstances of the various organisational units, as well as the diversity of the organisation's characteristics and locations. The aim was to compile a uniform, easily applicable set of criteria that takes into account the fact that ergonomic and psychosocial risks dominate in units performing administrative tasks, but also considers the circumstances that physical, mechanical and chemical hazards are more significant in technical and operational areas.

We grouped the initial 259 criteria into the following categories:

1. Work organisation and employee preparedness;
2. Documentation and records;
3. First aid and emergency equipment;
4. Work environment and infrastructure;
5. Handling of materials and chemicals;
6. Personal protective equipment;
7. Hygiene and cleanliness considerations.

Assessment criteria used to evaluate the occupational safety compliance of organisational units

We organised the hundreds of criteria collected into the seven categories above. We then prepared an evaluation table, which we filled in with data collected from the organisational units.

The working group drew up a specific schedule for carrying out the already clarified inspections and worked at the inspection sites for 22 weeks.

6. Comparison of existing and proposed new regulations in terms of legal compliance

The existing occupational safety regulations were adopted by management on 1 June 2018 under resolution number 110/2018.

Similarities:

- Purpose and scope: The purpose of both regulations is to create conditions for safe work within the organisation in order to protect the health of employees.
- Occupational safety tasks and responsibilities: There is significant overlap in the structure of the organisation, including the responsibilities of managers. Both documents contain rules on occupational safety training, risk assessment and accident management.
- Employee obligations: The obligations of employees to comply with occupational safety rules, provide first aid and use the necessary personal protective equipment are the same in both regulations.

Differences:

- Classification and categorisation of hazardous jobs: The new regulations would provide a more comprehensive classification of hazards and health risks and regulate health protection requirements for specific jobs in greater detail, including the handling of carcinogenic substances and radiation protection obligations.
- Occupational health services: The new regulations would contain more detailed requirements for occupational health services and occupational health examinations, paying more attention to the

frequency and obligations of regular and unscheduled medical fitness examinations, which would be more in line with the organisation's objectives.

- Education and training: The new regulations would introduce stricter provisions on education, first aid training and further training for occupational safety officers and representatives, which would serve to strengthen practical knowledge.

With the introduction of more comprehensive health protection rules and regular education and training programmes, the occupational safety system would be able to operate more effectively, increasing safety and reducing the risk of accidents, as well as complying with legal requirements. Its introduction as soon as possible would be recommended in order to standardise regulations and develop a more comprehensive occupational safety system.

Figure 1 compares the current regulations with the new occupational safety system and regulations we have designed.

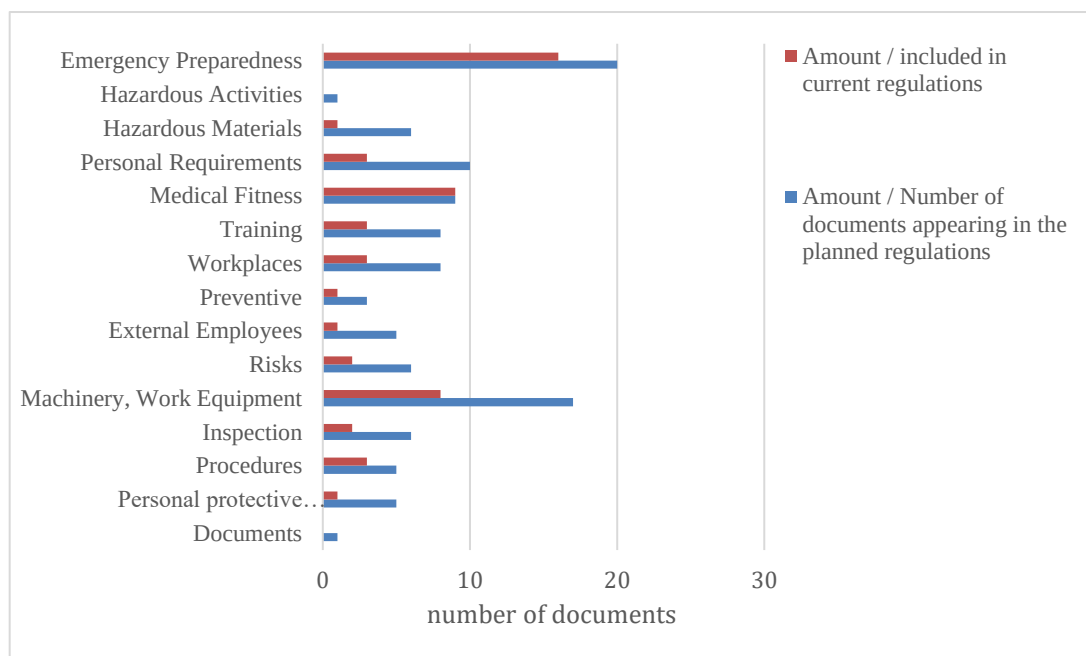


Figure 1. Comparison of regulations by topic

7. Summary

In the course of our work, we examined the current organisational structure and the basic regulatory structures that determine the cooperation between organisational units. We examined the institution's current regulations, with particular regard to their scope and structure. The current occupational safety regulations are based on a document prepared in 2018, which covers the personal, material and organisational conditions for safe work. The planned new regulations will apply to teachers, researchers, administrative and technical staff, and students, taking into account the specific occupational safety requirements of the various jobs. The currently available occupational safety regulations have been developed in accordance with Hungarian legislation and regulations, thus ensuring the health and safety

of employees and students. However, structural changes at the institution require further occupational safety reforms, particularly to ensure a safe environment for employees.

Various risk factors were analysed in the different organisational units.

When developing the assessment criteria, the organisational units were first analysed using several hundred criteria, then a reduced number of criteria, following a predefined chronological table.

The criteria system developed is highly effective in identifying sources of danger, classifying risks and determining the necessary protective measures, thus supporting an organised approach to occupational safety.

One of the important conclusions of our work is that the new organisational transformation and expanded portfolio require the development of an occupational safety system that also meets the specific needs of the various organisational units. The work makes several recommendations on how the occupational safety system could be further developed in a modular way and made more flexible, taking into account the different challenges of different work environments.

The summary proposals include the restructuring of the occupational safety training system, the customisation of protective equipment and regular checks on its condition, the ergonomic design of the working environment, and mental health support and stress management for employees. These recommendations can contribute to the development of an occupational safety system that is capable of adapting to organisational changes and new challenges.

References

- [1] Földházi, M. (2019). Munkavédelem a közsférában – Kockázatok és szabályozások. *Munkavédelmi Szemle*, 2019/2.
- [2] Robson, L. S., Clarke, J. A., Cullen, K., Bielecky, A., Severin, C., Bigelow, P. L., Irvin, E., Culyer, A., & Mahood, Q. (2007). The effectiveness of occupational health and safety management system interventions: A systematic review. *Safety Science*, 45 (3), pp. 329–353. <https://doi.org/10.1016/j.ssci.2006.07.003>
- [3] Szabó, Z. (2020). Oktatás szerepe a munkavédelmi kultúra fejlesztésében. *Munkaügyi Szemle*, 2020/4.
- [4] National Institute for Occupational Safety and Health (NIOSH) (2017). *Ergonomic Guidelines for Office Work*. Atlanta: Centers for Disease Control and Prevention (CDC), U. S. Department of Health and Human Services.
- [5] EU-OSHA (2015). *Risk assessment tools and guidelines*. Bilbao: European Agency for Safety and Health at Work.
- [6] Hale, A. R., Hovden, J. (1998). Management and culture: the third age of safety. In Feyer, A. M., Williamson, A. (Eds.). *Occupational Injury: Risk, Prevention and Intervention* (pp. 129–165). Taylor & Francis, London. ISBN 0-7484-0647-6
- [7] Leka, S., Griffiths, A., & Cox, T. (2003). *Work Organization and Stress*. Geneva: World Health Organization.
- [8] Santos, W., Lorente, A., Rojas, C., Mariscal, G., & Lorente, R. (2025). Impact of personal protective equipment in preventing occupational injuries: a systematic review and meta-analysis. *Frontiers in Public Health*, 13, 1720363. <https://doi.org/10.3389/fpubh.2025.1720363>
- [9] European Agency for Safety and Health at Work (EU-OSHA) (2007). *Introduction to work-related musculoskeletal disorders*. FACTS, pp. 70–71. https://osha.europa.eu/sites/default/files/Factsheet_71_-_Introduction_to_work-related_musculoskeletal_disorders.pdf European Agency for Safety & Health at Work