


M. Piňosová, R. Králiková\*

# QUALITY OF THE WORKING ENVIRONMENT: AN OVERVIEW OF THE CURRENT SITUATION IN THE SLOVAK REPUBLIC

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*SUMMARY: For the individual and for society, human life and health are great values, which are often particularly difficult or impossible to measure, though they are irreplaceable values. Even in the oldest historical stages of the development and life of society, many important doctors and scientists were interested in the social aspects of health care, e.g. Hippocrates, Aristotle, Avicenna, Paracelsus († 1541, Swiss philosopher and physician) and Georgius Agricola († 1555, German chemist and mineralogist). Based on their own experience gained from daily contact with workers and their working environment, they examined disorders caused by the harmful factors of the working environment and working processes. The ever-changing world of work increasingly brings new risks into working processes, which are directly related to the work performed by employees. As part of the EU-OSHA (European Agency for Safety and Health at Work) strategy to increase health and safety at work, the European Risk Observatory called on EU Member States to improve the detection of these risks in the working environment. Considering the above, the authors of this article have set themselves the goal of mapping the current situation in the area of the creation, protection and quality management of the working environment. They describe general requirements for protecting occupational health and safety, mainly in Slovakia. They are convinced that current developments present the need to know as much as possible about the living and working environments, to have a thorough knowledge of working conditions and all the factors that affect the health of employees, to know and choose assessment procedures to reduce the negative effects of these factors to a minimum. It is important that we keep in mind that healthy working conditions are among the most valuable assets of individuals, communities and nations.*

**Key words:** *environmental quality, risk factors, human health, employer, employee*

## INTRODUCTION

An integral part of the philosophy of sustainable development is the focus on improving the quality of life, especially working life. Work and the workplace are important determinants of the health of an individual and of society. Apart from the positive impact, a person's workplace may also have a negative impact, ranging from insi-

gnificant changes (occupational stigmas) through more severe changes (occupational diseases) to fatal cases (*Buchancová, 2003, Dura et al., 2018*).

Even though scientific and technological developments have, in many cases, brought about a substantial improvement in working conditions, employees are still exposed to noise, a variety of pollutants, vibrations, electromagnetic radiation, etc. even today. All these features of the workplace have a significant impact on people and are therefore regulated by legislation that lists limit values and above-limit values regarding

\*Miriama Piňosová, Ph. D., corresponding author (m.p.tuke@gmail.com), Ružena Králiková, Ph. D., Technical University of Košice, Faculty of Mechanical Engineering, Institute of Energy and Process Engineering, Department of Process and Environmental Engineering, Park Komenského 5, 042 00 Košice, Slovakia.

individual components of the workplace. In order to ensure optimal conditions, quality measurement technology and sophisticated methods of quality assessment of the workplace are used (Băbuț & Moraru, 2018).

Assessing working conditions is a process that results in an expert statement on the level of health risks posed by factors in relation to the working activities being carried out. The basis of the assessment of working conditions with possible relation to diseases and harm to health is the assessment of potential risk factors, i.e. assessing the level of their action via observation, analysis of job descriptions and procedures, discussing the circumstances and manner of performing job activities, measuring the harmfulness of factors, burden and response of the body to such factors, as well as aligning findings with regulations, limits and recommended values. It is also necessary to take into account the level of tolerance and the dynamics of the employees' health (Buchancová, 2003, Provazník, 1997, 1998).

Objective evaluation and measurement of the conditions of the working environment and workplace require a comparison of findings with the requirements of generally binding regulations and technical standards. Basic approaches to the assessment of material characteristics in the working environment are:

- **unmeasurable subjective assessment, or hardly measurable factors**, it is sufficient for informational purposes only to detect the state of the environment for the base-sets which can be taken to improve it,
- **objective evaluation of measurable factors using current methods and measurement techniques when required to obtain accurate data**, measurement is usually recommended only when the subjective assessment has identified a real need for objective tests that obtain data by measuring (Buchancová, 2003, Lumnitzer et al., 2013, Provazník, 1998).

The results of these evaluations are used to improve the working environment, improve the working conditions of employees, eliminate the effects of negative environmental factors, increase safety and reduce injuries and illnesses.

In analyzing the working environment it is necessary, above all, to identify which factors are disruptive and harmful and which are significant in terms of improving work performance, what the intensity of action of these factors is and what the system provides with respect to a particular job, what the alternative solutions of technical or organizational measures to ensure an optimal working environment are and what the effectiveness of possible measures (optimal, partial, emergency) is. The principles, criteria and parameters laid down in legislation and standards, are the basis for analysis and evaluation of factors in the working environment.

## MATERIALS AND METHODS

### Characteristics of the Working Environment

The huge development of science and technology has brought new technologies, new business processes, the possibility to explore the unknown, introduce newer and more modern machinery and technologies, automated processes, and new job opportunities.

With these advances and the introduction of new technologies, a new and yet-unknown risk began to emerge. The working process now entails more work factors that are becoming increasingly difficult to identify, objectify or assess.

Qualitative and quantitative assessment requires new modern measuring equipment, the best laboratories and competent personnel for its implementation. In order to eliminate or reduce harmful factors of work and the working environment to the lowest level possible it is necessary to adopt a variety of technological, technical, organizational and other measures. Despite the adoption of these measures, the workplaces feature physical, chemical, biological and other factors in excess of permissible limits, and their effects can adversely affect the health of employees.

In order to prevent potential harm to health, it is important to know all the adverse factors that occur in the workplace, i.e. identify them, objectify them, ensure their qualitative and quantitative assessment, draw up reports on risk categorization and take measures to reduce them.

In the working and outside environment, a single factor is never found by itself, rather there are always a number of factors the effects of which can be combined, multiplied and thereby adversely affect the human body (*Lumnitzer et al., 2013*). For the assessment of any harmful agents present in the working environment, it is important to know the adverse effects of each one of the present factors and the ways they enter the body, which parts of the body they can damage, what difficulties they may cause, symptoms they can cause, and many others (*Buchancová, 2003*).

Evaluating and assessing health risks at work due to exposure to harmful workplace factors and the working environment is a challenging and long-term process. Limit values are defined for the categorization of types of work in such a way that it is not foreseeable that, according to current scientific knowledge, they will be detrimental to the health of employees. However, these limit values are set for each factor alone and do not take into account the effect of the combined action of individual factors on the human body (*Piňosová, Andrejiová, Badida, et al., 2018, Piňosová, Andrejiová, et al., 2012, Piňosová & Andrejiová, 2017*).

Currently, the effect of environmental factors is most frequently assessed by comparing the individual with determining the actual (permissible or recommended) value.

Values of working environment factors can be determined by calculation, measurement, or a reliable estimate. The optimum value for the working environment is given by standards, legislation, health regulations, or professional literature. Permissible (maximum and minimum) values of working environment factors are usually determined by calculation (using the correction coefficients) of the basic (optimal) values.

Currently, there are agencies and laboratories authorized to perform certified measurement of working environment factors, especially noise, vibration, lighting, dust and electromagnetic radiation. Supervision of these entities is the responsibility of the Office of Public Health, which is part of the Ministry of Health. The State Institute of Metrology is responsible for supervision of measurement techniques.

## Evaluation of quality of the working environment

There are three kinds of rating of the quality level of the working environment:

- **subjective** (sensory) **evaluation**,
- **objective evaluation** (according to physical laws),
- **assessment by prescription** (for legislation and standards) (*Andrejiová et al., 2019; Buchancová, 2003*).

There is a generalization of a Regulatory Evaluation objective or subjective assessment, and it is enshrined in legislation or other binding regulations. This type of evaluation is essential for all aspects of the environment and therefore the level of assessment factors carried out compare the actual values with the permissible values. Above (or failing) the limit value means the impact of the parameter is considered negative or harmful. Depending on the type, variables are often standardized intervals of optimal conditions for long or short-term viable conditions, bounded by the highest permissible values. Most hygienic regulations deal with only one factor of the environment in some cases, however, in determining the limit values they take additional information into account:

- **Isolated evaluation of factors in the working environment:** in an isolated evaluation, the procedure does not enable comparison of the quality of the environment with several different parameters. It is then easy to decide about harsher environments where there is excessive noise or lack of space with light.
- **Partial evaluation methods for the working environment:** partial evaluation methods are based on assessing the effects of individual workplace factors in the working environment for partial examination and measurement.
- **Method of assessing the working environment using coefficients:** the basic principle of this method for assessing the quality of working environment factors lies in the fact that each level of workplace factors is assigned a specific relative value  $F_i$  under precisely defined criteria. Coefficients

vary in the interval  $<0, 1>$ , the value zero is an unacceptable level, while assessment of factors with the value of one corresponds to the optimal level (Dura et al., 2018, Piňosová, Andrejiová, & Lumnitzer, 2018).

**The human and working environment**

In assessing the impact of work and the working environment on human health it must be

remembered that health is the result of the interaction of factors in the living and working environment, genetic factors and lifestyle. The impact of the working environment and work usually lasts from adolescence to old age, in Slovakia an average of 40-50 years. Statutory working time of 8 hours daily means that a working-age person spends one third of the day at work.

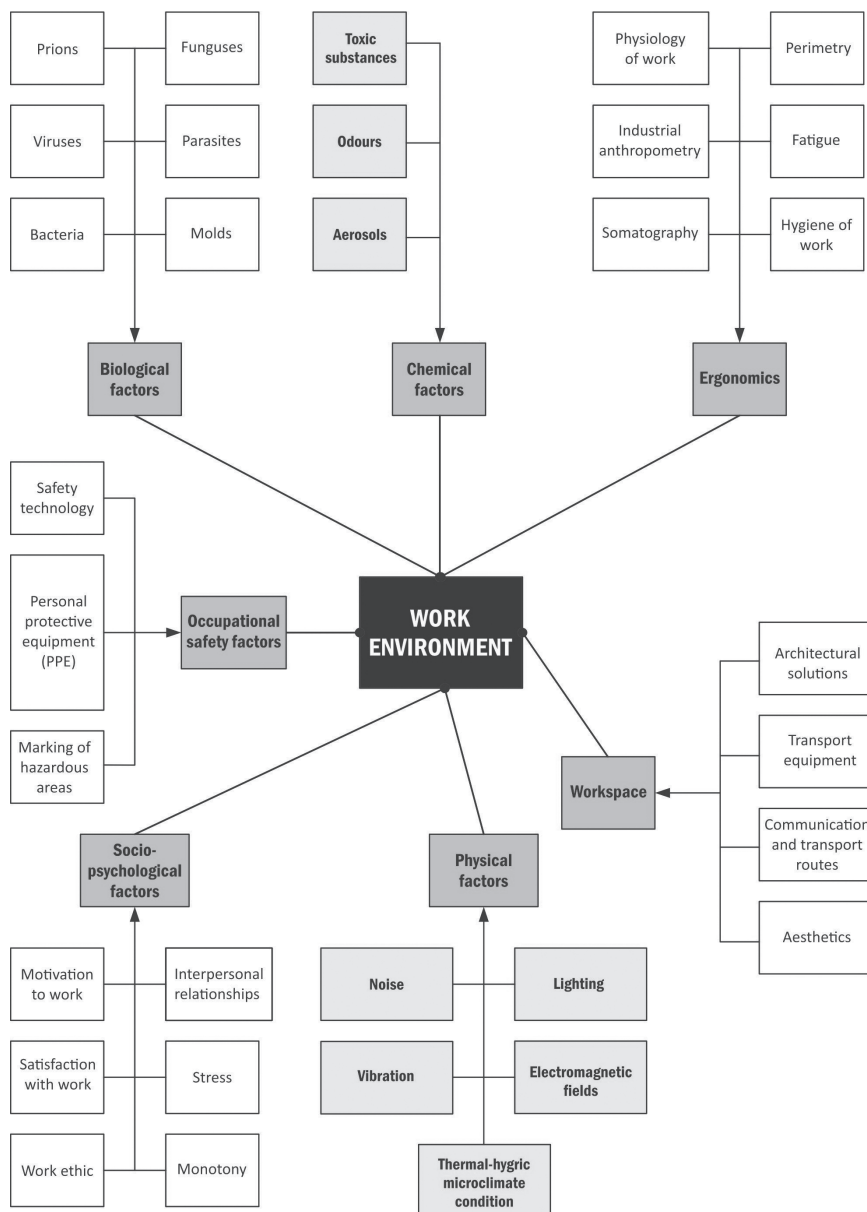


Figure 1. Division of working environment factors  
 Slika 1. Podjela čimbenika radne okoline

The effects of the living and working environment mutually overlap and influence each other. We always look at the person holistically in assessing their health status in relation to the work being carried out, considering the environment, living conditions and the lifestyle of the individual. The large differences between countries in ensuring healthy working conditions and the health of workers mean that each year, authorities record 100 million accidents worldwide, 200 000 occupational fatalities and 1 million chronic occupational diseases. It is estimated that annually, as many as 160 million new diseases occur in the world that have something to do with work. According to expert estimates, in industrialized countries 10-30 % of employees are exposed to harmful physical activity at work while in less developed countries this applies to more than 50 % of employees. We must realize that humans are an integral part of the working environment and its impact on their health is directly dependent on genetics and processes in those living and working conditions (see Figure 1) (*Lumnitzer et al., 2013*).

## **THE CURRENT STATE OF EVALUATION OF PHYSICAL FACTORS IN THE WORKING ENVIRONMENT IN SLOVAK REPUBLIC**

The values of the determinants help to answer the question to what extent the physical factors of the work and the working environment pose a risk to the health of the employee, or the extent to which the measures taken are effective. Adherence to them or exceeding them speaks not only about the level of risk but also about the level of protection of employees' health. Within the Slovak Republic, the basis for assessing the fulfilment of these requirements is the comparison of results of direct or indirect measurement with the values of determining quantities set out in decrees, government regulations and STN

standards (taken from international standards). Figure 1 shows a list of selected legal regulations of the Slovak Republic that are related to occupational health and safety.

The objectification of physical factors in the living and working environments is carried out according to Professional Guidelines 1/2011 of the Ministry of Health of the Slovak Republic no. OOFŽP-7674/2010, which lays down a uniform procedure for the qualitative and quantitative assessment of their potential effects on health. This Technical Guideline applies to the measurement of noise and vibration, daylight and artificial lighting, electromagnetic fields, the thermal/humidity microclimate and the measurement of other physical factors that are determined or evaluated at the place they occur. The complete regulation of the whole area of occupational health protection is the European Council Directive 89/391/EEC of 12 June 1989 on the measures to improve the occupational health and safety of workers. This directive states that workers may be exposed to dangerous environmental factors in the workplace during their working life. Since Slovak legislation is currently harmonized with the EU, the term "risk assessment" and other concepts related to this procedure are also included in our legal norms. In our legislation, the area of risk assessment in the workplace is specified in the Labour Code of the National Council of the Slovak Republic no. 311/2011 Coll., and in the Act on Protection, Support and Development of Public Health of the National Council of the Slovak Republic no. 355/2007 Coll. Details on the factors of work and the working environment according to the classification of occupations into categories are given in Annex no. 1 of the Decree of the Ministry of Health of the Slovak Republic no. 448/2007 Coll., on the details of the factors of work and the working environment in relation to the categorization of works in terms of health risks and on the requirements of the proposal for the classification of works into categories.

	<b>Legal Regulations Related to Occupational Health Protection Valid for the Slovak Republic</b>	<b>Implementation of EU Directives</b>	<b>Slovak Technical Standards (STN)</b>
<b>Noise</b>	Regulation of the Government of the Slovak Republic no. <b>115/2006</b> Coll., on minimum health and safety requirements for the protection of employees against risks related to noise exposure	Directive <b>2003/10/EC</b> of the European Parliament and of the Council of 6 February 2003 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise) (Seventeenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC)	<b>STN EN ISO 9612:2009 (01 1623)</b> Acoustics. Determination of occupational noise exposure. Engineering method.
<b>Vibration</b>	Regulation of the Government of the Slovak Republic no. <b>416/2005</b> Coll., on the minimum health and safety requirements for the protection of workers from the risks related to exposure to vibration	Directive <b>2002/44/EC</b> of the European Parliament and of the Council of 25 June 2002 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration) (sixteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) - Joint Statement by the European Parliament and the Council	<b>STN EN ISO 5349-1:2001 (01 1406)</b> <b>STN EN ISO 5349-2:2001 (01 1406)</b> Mechanical vibration. Measurement and evaluation of human exposure to hand-transmitted vibration. Part 1: General requirements Part 2: Practical instruction for measuring at the workplace <b>STN ISO 2631-1:1997 (01 1405)</b> <b>STN ISO 2631-2:2003 (01 1405)</b> Mechanical vibration and shock. Evaluation of human exposure to whole-body vibration. Part 1: General requirements Part 2: Vibration in buildings (1 Hz to 80 Hz)
<b>Lighting</b>	Decree of the Ministry of Health of the Slovak Republic no. <b>541/2007</b> Coll., on details of lighting requirements at work		<b>STN EN 12464-1:2011 (36 0074)</b> <b>STN EN 12464-2:2014 (36 0074)</b> Light and lighting. Lighting of work places. Part 1: Indoor work places Part 2: Outdoor work places
<b>Electromagnetic fields</b>	Regulation of the Government of the Slovak Republic no. <b>209/2016</b> Coll., on minimum health and safety requirements for the protection of employees against risks related to exposure to electromagnetic fields	Directive <b>2013/35/EU</b> of the European Parliament and of the Council of 26 June 2013 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) (20th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) and repealing Directive 2004/40/EC	<b>STN EN 62232:2017 (36 7087)</b> Determination of RF field strength, power density and SAR in the vicinity of radiocommunication base stations for the purpose of evaluating human exposure
<b>Microclimatic conditions</b>	Decree of the Ministry of Health of the Slovak Republic no. <b>99/2016</b> Coll., on details of health protection against heat and cold stress at work		<b>STN EN ISO 15265:2004 (83 3557)</b> Ergonomics of the thermal environment. Risk assessment strategy for the prevention of stress or discomfort in thermal working condition
<b>Chemical agents</b>	Regulation of the Government of the Slovak Republic no. <b>355/2006</b> Coll., on the protection of employees against risks related to exposure to chemical agents at work	Directive <b>2008/50/EC</b> of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe	<b>STN ISO 8756:1994 (83 4109)</b> Air quality. Handling of temperature, pressure and humidity data <b>STN EN 481:1993 (83 3621)</b> Workplace atmospheres. Size fraction definitions for measurement of airborne particles <b>STN EN 13936:2014 (83 3603)</b> Workplace exposure - Procedures for measuring a chemical agent present as a mixture of airborne particles and vapour - Requirements and test methods

Figure 2. List of selected legal regulations of the Slovak Republic related to occupational health and safety protection

Slika 2. Popis odabranih pravnih propisa Republike Slovačke vezano za zaštitu zdravlja i sigurnosti na radu

On 29 November 2013, the Ministry of Health of the Slovak Republic issued another of Professional Guidelines 15/2013 regulating the procedure for measuring and evaluating lighting (S09982-OL-2013) and 16/2013 the thermal-humidity microclimate (OOFŽP/268/2013). The methodology given in this technical guideline is binding for measurements, the result of which is to be used to assess lighting and the microclimate in terms of their potential impact on health. List of selected legal regulations of the Slovak Republic related to occupational health and safety protection is shown in the Figure 2.

### Illnesses and other Occupational Harm to Health in Slovakia 1987-2019

Even now, there are cases of neglect in the area of protecting health against occupational diseases. On the one hand, this occurs with employers who do not comply with legislation and ignore the topic, thereby underestimating the risk of illness among their employees. On the other hand, this is due to the employees themselves, gambling with their health in order to keep their jobs, regardless of the consequences (Legáth, 2010). The method of reporting and recording occupational disease and the threat of occupational disease is defined in the Slovak Republic by Section 31(b) (1, 2) of Act no. 355/2007.

The basic roles of clinical occupational medicine and clinical toxicology in Slovakia include the comprehensive diagnosis, treatment and assessment of diseases that arise in connection with adverse, harmful factors from work and the working environment. This is also connected to the reporting of occupational diseases and the risk of occupational diseases. Based on data documented by the National Health Information Centre (NHIC), a total of 21 045 new occupational diseases were reported in Slovakia during 1987-2019. A significant decrease in the number of reported occupational diseases was recorded up to 1995, from 1 262 (1987) with a slight increase to 1 331 (1990) then down to 601 (1995). Between 1995 and 2019, the number of newly acquired occupational diseases decreased by roughly half, with moderate variation, to 347 (2019), with the lowest ever number in 2013 (301).

Alongside the significantly decreasing trend in the number of reported occupational diseases, there was a gradual increase in the proportion of women among the number of reported occupational diseases since 2003. Since 2010, the total number of reported occupational diseases in men and women has decreased in parallel, with stronger increases in men in 2014 (244) and 2017 (207) see Figure 3.

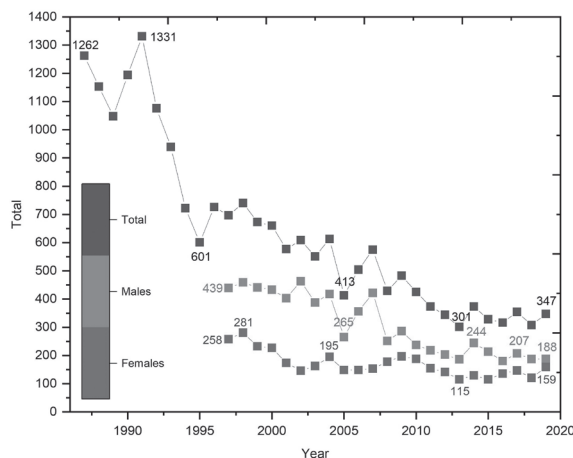


Figure 3. Development of occupational diseases in years 1987-2019 in the Slovak Republic in Males and Females

Slika 3. Razvoj bolesti na radu u godinama 1987.-2019. u Republici Slovačkoj u muškaraca i žena

The most frequent explanation for this decline presented in various publications is increased prevention and increased levels of occupational health and safety. However, we would like to argue that there are many other reasons that affect these statistics. This includes objective reasons (development of employment levels in individual sectors, higher share of sole traders, etc.), but also subjective ones such as people's ignorance, fear of loss of employment, legal awareness or bureaucratic obstacles to claiming compensation. Claiming compensation in respect of an occupational disease is not easy at all in Slovakia. An employee often encounters so many complications in the process of obtaining compensation that they would rather withdraw their claim, if they even know they have a claim at all.

A total of 21 045 newly acquired occupational diseases were reported during 1987-2019. The most reported diseases included (Table 1):

1. Disease of bones, joints, tendons, and nerves of limbs from long-term, inordinate, one-sided workload (item 29 given in Annex no. 1 of the Social Insurance Act 461/2003 Coll.).
2. Disease of bones, joints, muscles, vessels, and nerves limbs caused at work with vibrating tools and devices (item 28 given in Annex no. 1 of the Social Insurance Act 461/2003 Coll.).
3. Infectious and parasitic diseases including tropical infectious diseases, and parasitic diseases and diseases transmissible from animals to humans (items 24-26 given in Annex no. 1 of the Social Insurance Act 461/2003 Coll.).
4. Hearing defect from noise (items 38 given in Annex no. 1 of the Social Insurance Act 461/2003 Coll.).

Skin diseases apart from skin cancer and communicable skin diseases (items 22 given in Annex no. 1 of the Social Insurance Act 461/2003 Coll.).

Analysis of occupational diseases reported over the last 32 years (1987-2019) shows a more significant decrease in the number of reported occupational diseases in the second half of the reporting period (2003-2019) of 49.76 %, i.e. 6 971 cases. Compared to the period from 1987 to 2002, we can observe a decrease of 35.61 % (713 cases) in diseases of the bones, joints, muscles, blood vessels and nerves in the extremities caused by work with vibrating tools (item 28). Conversely, a stronger increase is observed in occupational diseases affecting

**Table 1. The most frequently occupational diseases in the last 32 years in the Slovak Republic**

**Tablica 1. Najčešće bolesti na radu unatrag 32 godine u Republici Slovačkoj**

	Name of disease	Conditions under which they arise	Total
22	Occupational dermatoses - Skin diseases apart from skin cancer and communicable skin diseases.	From exposure to the influence of chemical, physical (except ionising radiation) and biological pollutants in the working environment and at work, causing occupational dermatosis	2 565
24-26*	Infectious and parasitic diseases including tropical infectious diseases, and parasitic diseases and diseases transmissible from animals to humans.	When exposed to the stated hazard	4 516
28	Vibration disease - Diseases of bones, joints, muscles, vessels, and nerves limbs caused at work with vibrating tools and device.	When in contact with sources of vibration	3 291
29	Diseases of bones, joints, tendons, and nerves of limbs from long-term, inordinate, one-sided workload.	When exposed to the stated hazard	5 035
33-34*	Pneumoconiosis	When exposed to the stated hazard	895
38	Hearing defect from noise by which is reached loss hearing according to Fowler with harm younger as 30 years at least 40 %. Harm older as 30 years then presented level is increased by 1 % each two years until 50 years age of harm person and since that time loss hearing must exceeded 50 %; the other ones are Annex no. 1 to Act no. 461/2003 Coll., on social insurance.	When exposed to excessive noise	2 197

\* (24) Diseases on communicable and parasitic illnesses apart from tropical communicable and parasitic diseases and illnesses communicable from animals on people. (25) Tropical communicable and parasitic diseases. (26) Illnesses communicable from animals on people directly or by means of communicants. (33) Diseases on dusting of lung with dust containing silicon oxide (silicosis, silicotuberculosis) including (miner pneumoconiosis) - a) with typical x-ray signs take account on dynamics of diseases; b) in connection with active tuberculosis. (34) Diseases on dusting of lung with asbestos dust (Asbestosis) - a) with typical x-ray signs; b) in connection with lungs cancer.



the musculoskeletal system, the circulatory and nervous systems of workers exposed to prolonged excessive and one-sided upper limb loads of 55.58 %, i.e. 3 065 cases in women (item 29), and additional results are listed on Figure 4 and Table 2.

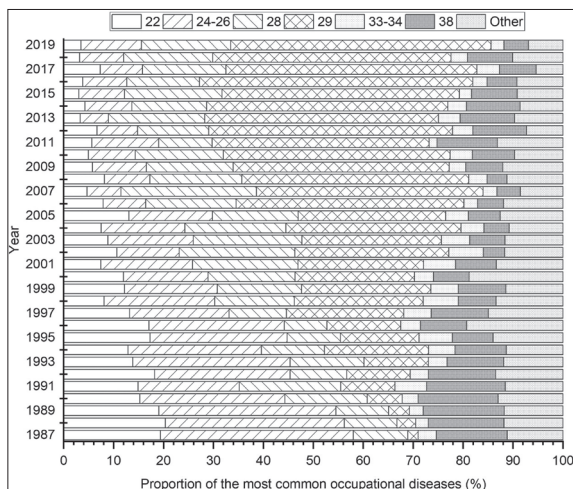


Figure 4. Development of occupational diseases in years 1987-2019 in the Slovak Republic

Slika 4. Razvoj bolesti na radu u godinama 1987.-2019. u Republici Slovačkoj

Occupational disease from vibration (item 28) has long been one of the most common occupational diseases in Slovakia. For the last two decades, after occupational disease from long-term excessive one-sided load of the limbs, the second biggest cause of occupational disease has been vibration (except in 2011, when hearing damage caused by noise was temporarily in second place). The high number during 1987-2007 gradually saw a significant decrease during 2008-2019, with the lowest incidence 40 cases recorded in 2011. The numbers increased slightly in the following years (Figures 5-6). Hearing loss caused by noise (item 38) is regularly the fourth most common type of annual reported occupational disease. The annual number of reported cases of hearing damage caused by noise in the Slovak Republic decreased significantly during 1987-2008. During 2009-2014, a rise in this type of disease was again recorded, followed by a decrease in 2015 with moderate fluctuation. The lowest incidence was recorded in 2008 and 2019 with 17 cases in both years. Despite a clear downward trend in the number of reported occupational diseases, disease of the limbs from long-term excessive one-sided load (item 29) had only a slightly decreasing trend – there was even a 55.58 % increase in reported numbers compared to the period from 1987 to 2002.

Table 2. Comparison of occupational diseases reported in the last 32 years

Tablica 2. Usporedba bolesti na radu prijavljenih unatrag 32 godine

Disease number	Total	1987-2002	2003-2019	Decrease/increase	% *
Total all	21 045	14 008	7 037	- 6 971	49,76
22	2 565	2 125	440	- 1 685	79,29
24-26	4 516	3 750	766	- 2 984	79,57
28	3 291	2 002	1 289	- 713	35,61
29	5 035	1 970	3 065	+ 1 095	55,58
33-34	895	637	258	- 379	59,50
38	2 197	1 684	513	- 1 171	69,54

\* Decrease or increase in percentage for the second half of the reference period compared to 1987-2002

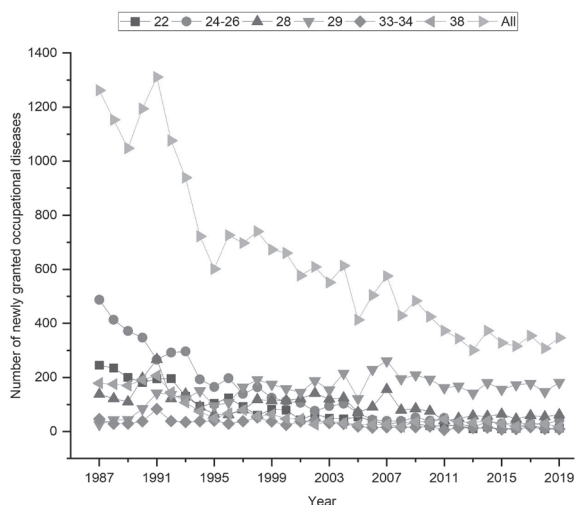


Figure 5. Trends in occupational diseases caused by physical agents in years 1987-2019 in the Slovak Republic

Slika 5. Trendovi bolesti na radu uzrokovanih fizičkim agensima u godinama 1987.-2019. u Republici Slovačkoj

In 2019, 347 cases of occupational disease and workplace poisoning were reported in the Slovak Republic. When prorated to 100 000 workers, 13.4 % of occupational diseases were newly acquired and reported. Compared to the situation as of 31.12.2018, the number of reported occupational diseases had increased by 39 cases (11.24 %). In this year, occupational disease was most

common among workers between the ages of 50 and 59, representing 51.87 % of all reported occupational diseases. Since 1997, upper limb disease from long-term excessive and one-sided loading (item 29) has comprised the highest share of occupational diseases. Upper limb diseases due to vibrations (item 28) have been in second place since 1999. Disorders with hearing impairment (item 38) have been between 3rd and 5th place since 1990. In 2019, the diseases of the upper limbs due to vibrations were reported in 62 employees, i.e. 17.9 % (2nd place) of all reported occupational diseases in Slovakia, while in 2001 this disease had been reported in 122 employees, i.e. 21.1 %. Hearing problems due to noise were reported in 17 employees, i.e. 4.9 % (4th place) of all reported occupational diseases in the Slovak Republic, in 2001 this had been reported in 47 employees, i.e. 8.1 %.

The authors in other publications (Bubeníčková, 2008, Buchancová et al., 2016, Legáth, 2010, Šplíchalová & Hrnčíř, 2011) have addressed the analysis of occupational diseases and the system of categorization of work in relation to health protection at work in the Slovak Republic and in the Czech Republic. A large number of authors (Coelho, 2020, Kirin & Šimič, 2020, Kundlić & Smajla, 2020) have evaluated the quality of the work environment and assessed the negative

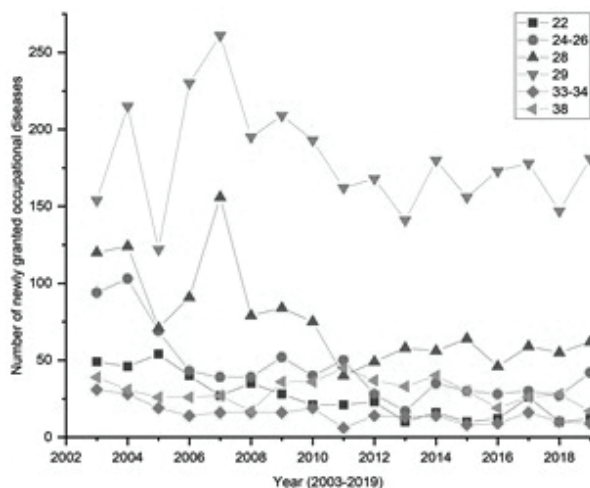
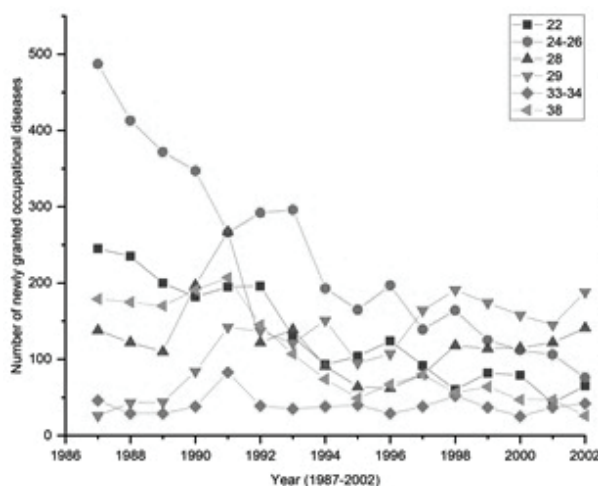


Figure 6. Trends in occupational diseases in the first (1987-2002) and second (2003-2019) observed period in the Slovak Republic

Slika 6. Trendovi bolesti na radu u prvom (1987.-2002.) i drugom (2003.-2019.) promatranom razdoblju u Republici Slovačkoj

impacts of physical factors in the working environment on the health of employees.

### Preventive Medical Examinations

One of the obligations of employers towards their employees is to arrange medical supervision including preventive medical examinations in relation to work. The type and frequency of medical examinations, which the employer is currently obliged to arrange for their employees, is gover-

ned by the relevant legislation, Section 30 (12, 13) of Act no. 355/2007 as amended.

A preventive medical examination in relation to work is performed: before starting work, in connection with the performance of work, before a change of tasks, when leaving employment and extraordinary examination.

The types of preventive examinations and their division are shown in figure 7.

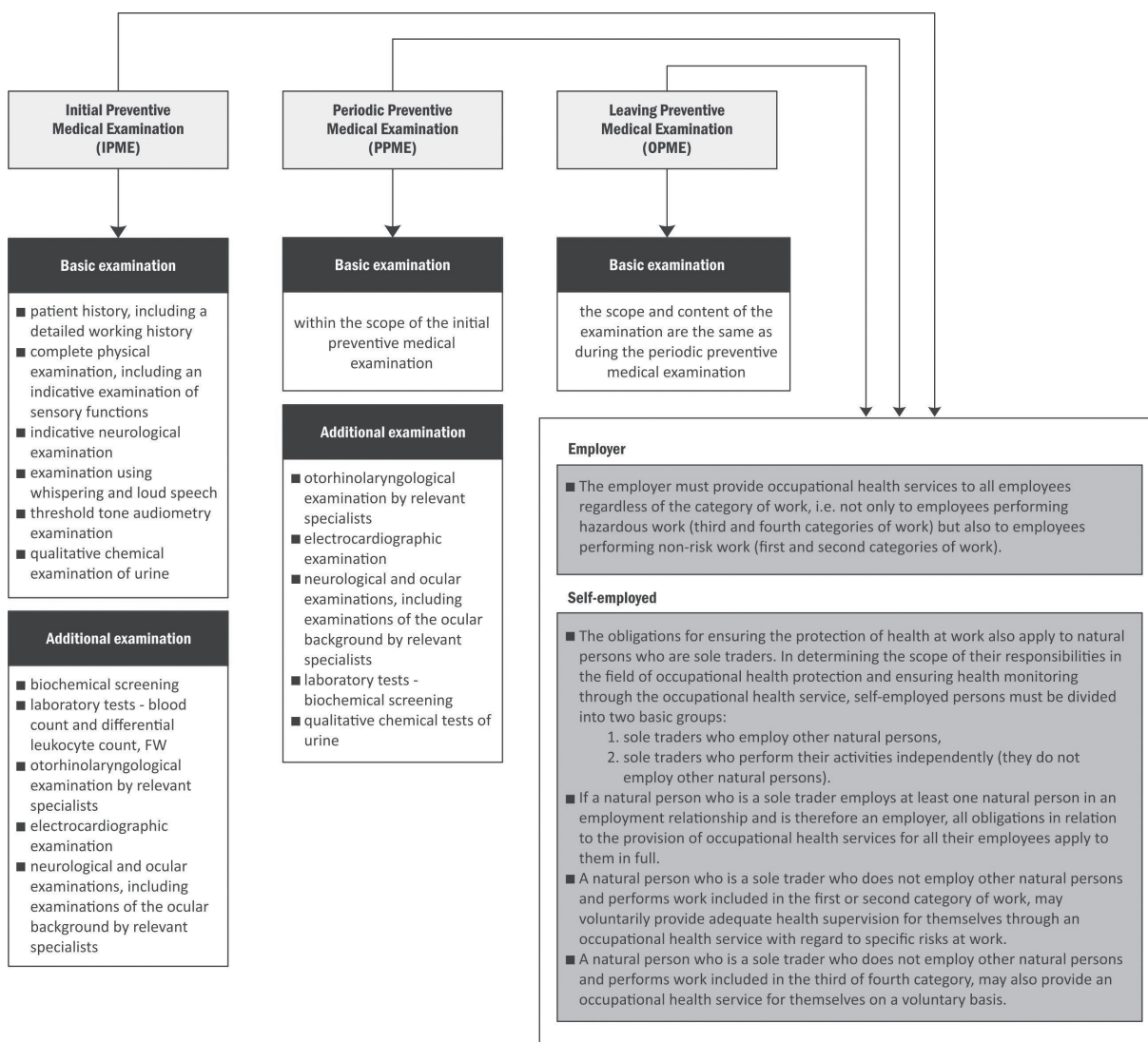


Figure 7. Types of medical examinations in relation to work valid for the Slovak Republic  
 Slika 7. Vrste medicinskog ispitivanja u vezi s radom koji vrijedi za Republiku Slovačku

From 01.01.2015 employers in Slovakia must also provide occupational health services for employees of the first and second category. The current legal regulation of occupational health services has been divided into two regulations, namely in Act no. 124/2006 on the Protection of Occupational Health and Safety, as amended and in Act no. 355/2007 on the Protection, Promotion and Development of Public Health, as amended.

In addition to this, there is also an implementing regulation for the occupational health service, Decree of the Ministry of Health of the Slovak Republic no. 208/2014 Coll. on the details of the scope and content of the performance of the occupational health service, on the composition of the team of experts who perform it, and on the requirements for their professional competence. The reason for the legislative changes is also the opinion of the European Commission, according to which the current Slovak legislation is inconsistent with Council Directive 89/391/EEC on the Introduction of Measures to Encourage Improvements in the Safety and Health of Workers as regards occupational health services for employees. According to it, the employer has a duty to provide occupational health services for all employees, regardless of the category of work. In addition, the Ministry of Health of the Slovak Republic justified legislative changes by the fact that up to 66 % of all occupational diseases are diagnosed to employees who perform work included in the second category.

## DISCUSSION AND CONCLUSION

### General Requirements for Occupational Health and Safety

The scope of occupational health and safety refers to legal entities and natural persons conducting business, i.e. self-employed persons who employ individuals, but also practical teaching. These people act on the instructions of the employer. The law provides the basic conditions for ensuring occupational health and safety to eliminate or reduce risks and factors underlying the occurrence of occupational accidents, occu-

pational diseases and other harm to health from work and general principles of prevention.

### Employer duties

The employer is obliged to implement measures to protect occupational health and safety, for example, identify safe work practices, to issue rules on occupational health and safety, to include employees in work with regard to their health, abilities and powers, not allow them to perform duties, which are not authorized and do not correspond to their health, they must provide employees with breaks in work, keep the prescribed documentation, evaluation of risks and draw upon it to establish a list of personal protective equipment, to provide their employees personal protective equipment free of charge and to maintain it in usable and working order. The employer is also obliged to provide the free washing, cleaning and disinfecting necessary to ensure personal hygiene and, where required to protect life, health or safety and provide beverages according to the internal regulation. It is required to prohibit smoking at a workplace where non-smokers also work (*Lummitzer et al., 2013*).

### Employee duties

The employee must, in particular, comply with the legislation to ensure occupational health and safety as well as other regulations, policies and procedures for work, which they have been demonstrably familiarized, operate selected machines and equipment only with special authorization for their use from the employer responsible for their operation, use personal protective equipment, train and participate in training, medical checks and examinations, and not be under the influence of alcohol and other drugs, not use alcohol in the workplace, for the duration of the working time must comply with the ban on smoking in the workplace, etc. (*Provozník, 1997, 1998*).

The employer is obliged to report, in writing immediately, the start of operations, as well as the nature and scope of, substantive changes, termination of service, work accidents, traffic acci-

dents, etc. In carrying out the inspection work it is obliged to allow free access to the workplace. It is necessary to provide information as it affects the protection of labour, for performance, documentation, construction equipment, etc. The labour inspector is entitled freely to enter workplaces at any time and conduct inspection work. The employer must provide, upon request or at the latest at the time of seizure, the identity of individuals within its workplace, evidence of an employment relationship with them. In this case, the individual is required to identify themselves on request to the labour inspector and explain the reason for their presence in the workplace (Piňosová, Lumnitzer, et al., 2012).

### Principles of Health – Prevention of Illness

Health protection at Work can be achieved by means of a group or individual prevention. More effective is a group prevent dedicated to the prevention for all workers, which is provided centrally. It does not interfere with working well-being, it depends not only on individual attitudes to one's own health or willingness to protect it, therefore it is possible, but it should also be preferred. The employer is responsible for its implementation. Employees are required to use all available measures to protect health.

Preventive measures can be divided into technical, organizational, personal protection, hygiene and diet, detection and identification of hazardous works, assessment of medical fitness for work (preventive medical examinations), health education and safe work

#### a) Technical measures

- **Eliminate risk** i.e. factors harmful to health in the working environment. It is, therefore, necessary to use such machinery, equipment, technologies and materials that are not a source noise, vibration, of chemical substances harmful to health or other factors.
- **Selection of closed production processes** in which harassing or harmful factors cannot penetrate the working environment.
- **Procedures to prevent direct contact** or exposure to factors adverse to the health of

workers (the introduction of mechanization, automation, remote control, and robotics).

- **Building sheltered workplaces** for local permanent technical staff. Must be designed to prevent the penetration of risk factors in these areas.
- **Create structurally separated parts of the plant for the source of the risk factor.**
- **Preventing the penetration of risk factor into secondary operations and the external environment.**

#### b) Organisational measures

These are a temporary replacement and supplement technical measures. They are particularly:

- **Reducing the number of persons exposed** to the minimum necessary.
- **Shorter exposure to risk factors for the shortest time**, e.g.:
  - a. regulation on breaks outside the workplace, in areas without risk factors,
  - b. shortening the stay of workers in areas with a risk factor to the time essential for business operations,
  - c. shortening the time in the workplace with a risk factor, for the remainder of the shift the worker may perform other work, which is not at risk,
  - d. organization of labour, to concentrate on risky operations or local time, thereby reducing the number of exposed persons
- **Modification to working practices to take account of the principle's health protection for employees** (e.g. sufficient time to ventilate areas, use of technical means, barriers, not to increase performance and production at the expense of the time required for the operation to ensure the protection of health).

#### c) Personal protection for employees

Personal protective equipment (PPE) should be used whenever and wherever technical or organizational measures fail to achieve the state of

a working environment without risk factors, or at least a state where the highest permissible values are not reached. These are the values for biological, physical and chemical factors in the 8-hour exposure that do not cause changes in the health of exposed persons, detectable using current diagnostic methods. These values are defined in generally binding regulations by the Ministry of Health. PPE should be allocated depending on what part of the body is protected; against to noise (helmet, ear protectors, ear inserts), chemicals, dust (masks, respirators, gloves, aprons, suits, boots), vibration (gloves), glow, heat (suits, gloves, goggles, shoes), etc.

The employer is required to provide PPE. Accreditation-field laboratory approved PPE must be provided free of charge all employees who need it for their work. In the workplace it must be available in sufficient quantity. Employees must be informed in training when and how to use PPE. When such a situation occurs, they are obliged to use it. The employer must maintain PPE in good working order and supervise its use. If there is a choice of several, equally effective personal protective equipment then consultation with employees should be used to choose the most comfortable for work.

#### d) Hazardous work

Workplaces and working processes to be addressed so that the employees were not at work, exposure to adverse and detrimental health effects. Work does not have a negative effect on health, but rather contributes to the development of physical and mental powers, i.e. the need to create optimal working conditions and occupational well-being, promoting health

If it is not possible even using available techniques with other appropriate organizational measures to achieve such conditions and factors harmful to health exceed values, which would directly harm health, a substitute precaution to prevent risk can be reducing the time of work. Hazardous work is work in which there is an increased risk of the occurrence of accidents, damage to mental health, occupational diseases, occupational poisoning or other harm. Hazardous work is determined by the health authorities based on a proposal from the employer and in consultation with the doctor responsible for

preventive care for employees in the organization and the employees' representatives.

Risk factors are divided into two groups:

- **Specific:** dust, noise, vibration, chemical substances, chemical carcinogens and working processes with a risk of chemical carcinogenesis, the pollutant causing the emergence of occupational skin diseases, ionizing radiation, electromagnetic fields large, lasers, infrared radiation, infection, excessive and long-term loading, allergens, increased pressure on the elbow nerve, increased pressure.
- **Nonspecific:** physical burden, neuropsychiatric burden, working position, microclimate, daylight, artificial lighting.

#### e) Assessment of medical fitness for work using medical preventive examinations

Medical fitness for work is assessed by a doctor under the findings of the health status of employees or other preventive medical examination. It is based on the knowledge of the working environment and requirements of the work, which can affect health.

- Medical fitness is considered:
  - a. in career choices (performed by paediatrician, designated doctor for preventive care of employees in the organization or department – Department of Occupational Medicine),
  - b. before starting work i.e. Initial check-up of all employees (performed by the designated doctor for preventive care for the employees of the organization),
  - c. in relation to working i.e. periodic, non-regular, exit side and preventive medical checks (making them instructed by the staff of preventive care organizations) of employees who perform an epidemiologically serious activity, particularly where the non-beneficial effect of the working environment may endanger the health of residents or employees, or employees engaged in activities which require special medical care.
- Employers are required:
  - a. not to hire employees without a positive outcome of preventive inspections,

- b. send employees for preventive examinations, keep records of them as well as inspection deadlines,
- c. medical facilities are to provide necessary information on the nature of work and working conditions,
- d. use the results of inspections for inclusion in work, reassignment to other work and adjustment of work and the working environment (*Šplíchalová & Hrnčíř, 2011*).

This paper has provided an analysis of the current situation regarding the working environment in Slovakia and acts as an article giving an overview. We looked at the assessment of occupational diseases since the occurrence of reported occupational diseases and occupational poisonings is one of the most important indicators of the care taken with the health of workers carrying out at risk occupations, which reflects not only the state of primary prevention of clinical manifestations of harm to health from working, but also the efforts of specialised occupational health services regarding diagnosis and reporting. Currently, the authors are working on a research article, which they expect to publish in the near term, analysing in detail the occurrence of reported occupational diseases in Slovakia, including a focus on age and gender, followed by an analysis of the relationships between the categories of work and the most common items on the List of Occupational Diseases and specific diagnoses of these items, factors of exposure and their occurrence in different sectors of the economy.

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## **KVALITETA RADNOG OKOLIŠA: PREGLED TRENUTNOG STANJA U REPUBLICI SLOVAČKOJ**

*SAŽETAK: Za pojedinca i za društvo u cjelini ljudski život i zdravlje velike su vrijednosti koje je često posebno teško ili nemoguće izmjeriti, premda su nezamjenjive vrijednosti. Čak i u najstarijim povijesnim fazama razvoja i života društva, mnoge su važne liječnike i znanstvenike zanimali socijalni aspekti zdravstvene zaštite, npr. Hipokrat, Aristotel, Avicena, Paracelsus († 1541., švicarski filozof i liječnik) i Georgius Agricola († 1555., njemački kemičar i mineralog). Na temelju vlastitog iskustva stečenog svakodnevnim kontaktima s radnicima i njihovom radnom okolinom, ispitivali su poremećaje uzrokovane štetnim čimbenicima radne okoline i radnih procesa. Stalno promijenjivi svijet rada sve više donosi nove rizike u radne procese koji su izravno povezani s poslom koji obavljaju zaposlenici. Kao dio strategije EU-OSHA (Europska agencija za sigurnost i zdravlje na radu) za povećanje zdravlja i sigurnosti na radu, Europski opservatorij za rizike pozvao je države članice EU-a da poboljšaju otkrivanje tih rizika u radnom okolišu. S obzirom na navedeno, autori ovog članka postavili su si cilj mapiranja trenutne situacije na području stvaranja, zaštite i upravljanja kvalitetom radne okoline. Oni opisuju opće zahtjeve za zaštitu zdravlja i sigurnosti na radu, uglavnom u Slovačkoj. Uvjereni su da trenutna zbivanja predstavljaju potrebu da se što više zna o životnom i radnom okolišu, da se temeljito poznaju radni uvjeti i svi čimbenici koji utječu na zdravlje zaposlenika, da se znaju i odaberu postupci procjene kako bi se smanjili negativni učinci ovih čimbenika na najmanju moguću mjeru. Važno je imati na umu da su zdravi uvjeti rada među najcjjenjenijim dobrom pojedinaca, zajednica i nacija.*

**Ključne riječi:** kvaliteta okoliša, čimbenici rizika, ljudsko zdravlje, poslodavac, zaposlenik

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