FACTA UNIVERSITATIS
Series: **Working and Living Environmental Protection** Vol. 20, Nº 3, 2023, pp. 157 - 166
https://doi.org/10.22190/FUWLEP2303157R

Review Paper

ANALYSIS OF THE ACCIDENTS AT WORK IN THE EUROPEAN UNION

UDC 331.45(4-672EU)

Tamara Rađenović

University of Niš, Faculty of Occupational Safety, Niš, Serbia

Abstract. *Accidents at work constitute a critical issue within the European Union (EU), impacting not only the health and safety of millions of workers but also the economic stability and productivity of member states. Statistical evidence of accidents at work is important for determining the most problematic sectors in which fatal injuries occur. The EU, with its diverse industries and extensive labor force, presents a unique context for studying occupational accidents. These incidents range from minor injuries to major catastrophes, affecting sectors as varied as manufacturing, construction, and services. The repercussions of such accidents are far-reaching, extending beyond the immediate physical harm to workers. They encompass significant economic dimensions, including direct costs like medical care and rehabilitation, and indirect costs like lost workdays, decreased productivity, and compensation claims, thus putting significant pressure on businesses, healthcare systems and national economies. The paper aims to provide a comprehensive overview of workplace accidents in the EU, emphasizing their economic significance. By providing a holistic view of workplace accidents in the EU, the paper underscores the urgent need for enhanced safety measures and proactive strategies to foster safer work environments, ultimately contributing to more sustainable economic growth and worker welfare.*

Key words: *accidents at work, occupational health and safety, European Union, statistical evidence, economic aspects*

1. INTRODUCTION

Ensuring a safe and healthy work environment is a crucial aspect of work quality and overall quality of life [1]. This is especially important concerning the social and economic aspects of the working conditions and the necessity for their improvement. The governments of the European Union (EU) countries acknowledge the socio-economic advantages of

Received November 30, 2023 / Accepted December 8, 2023
Corresponding author: Tamara Rađenović
University of Niš, Faculty of Occupational Safety, Čarnojevića 10a, 18000 Niš, Serbia
E-mail: tamara.radjenovic@znrfak.ni.ac.rs

improved occupational health and safety (OHS). The foundational principles for safeguarding workers' health and safety are established in the 1989 Framework Directive (89/391/EEC), whose primary goal is to promote advancements in OHS [2]. This legislation encompasses all activity sectors, public and private, mandating employers to ensure the health and safety of workers in all work-related aspects. Simultaneously, workers are required to adhere to health and safety guidelines set by their employers and to report any perceived risks.

For the period 2021-2027, the European Commission's policy direction in this area is detailed in the "EU Strategic Framework on Health and Safety at Work 2021-2027" [3]. This document sets the goal for the EU to maintain its leadership in advocating for high working conditions standards both within and outside the EU. It identified three key challenges: anticipating and managing the changes in the work environment due to green, digital, and demographic transitions; enhancing the prevention of occupational accidents and diseases; and boosting readiness for any potential future health crises.

The COVID-19 pandemic emphasized the vital role of health policy, particularly in the context of OHS. The European Commission (EC) is actively developing strategic policy guidelines aimed at enhancing workers' health and safety across the EU. This is especially pertinent considering emerging risks such as those from new working methods, technological advancements, digitalization, pandemic impacts, and related containment efforts, in addition to more traditional workplace hazards like exposure to dangerous substances. The establishment of policy goals and implementation of appropriate strategies and preventive measures requires consistent, reliable, and comparable statistical data.

Accidents at work represent a significant concern within the EU, affecting millions of workers across various industries. These incidents range from minor injuries to fatal accidents, encompassing a wide spectrum of hazards and risks. The diversity of industries within the EU, including manufacturing, construction, agriculture, and services, each presents unique challenges and accident profiles. Historically, the EU has seen varying accident rates across countries and sectors, influenced by factors such as industrial practices, regulatory frameworks, and safety cultures. Accurate and up-to-date statistics on accidents at work are essential for understanding the scale and nature of these incidents. These data indicate trends and patterns, highlighting the sectors and groups most at risk.

Analyzing accidents at work in the EU is crucial for several reasons. Firstly, it helps in identifying the underlying causes of accidents, which is fundamental for developing effective prevention strategies. Understanding the root causes, be they related to workplace conditions, human factors, or regulatory shortcomings, enables policymakers, employers, and workers to implement targeted interventions. Secondly, this analysis contributes to improving workplace safety and health standards, thereby safeguarding worker well-being and enhancing productivity. Moreover, it has significant economic implications, as accidents at work entail substantial costs related to healthcare, compensation, and lost productivity. Nonetheless, it emphasizes the need to humanize the workplaces, as well as the role of the OHS management system in sustainable development. Finally, analyzing these accidents fulfils a legal and ethical mandate within the EU, where worker safety is a fundamental right and a priority in social policy.

The primary objective of this article is to provide a comprehensive analysis of accidents at work in the EU, drawing upon the latest available data and research. This includes a statistical overview of workplace accidents across various sectors and EU countries, identifying trends and patterns, and comparing and contrasting the efficacy of different preventive measures and policies implemented across the EU, thus highlighting

successful strategies and areas needing improvement. This article aims to serve as a resource for policymakers, researchers, and practitioners in the field of OHS, providing a thorough understanding of the current state of workplace accidents in the EU and offering guidance for future actions.

The paper is structured as follows. After the introduction, the literature review is presented, followed by the methodology and data analysis. Finally, the discussion and conclusion are provided based on the conducted analysis.

2. Literature Review

The "Occupational Safety and Health in Europe: State and Trends 2023" report emphasizes that despite the development of an extensive framework for managing OHS risks in the EU since the mid-1980s, there are still areas that need improvement [4]. The rate of work accidents is decreasing, but this is counterbalanced by the rise of psychosocial and emotional stressors affecting worker well-being. Physical risks and ergonomic burdens remain high and stable. The report also highlights the need for wider and more comprehensive OHS measures due to new technologies at work, sector shifts, workforce changes, and globalization [4].

According to the study by Hollá et al. [5], the main causes of work accidents in the Czech Republic and Slovak Republic between 2010 and 2018 include inadequately assessed risks, unsafe workplace practices, and defective conditions of injury sources. In the Czech Republic, the failure to use or inconsistent use of personal protective equipment (PPE) and distractions or threats from others at work were also significant causes. In the Slovak Republic, shortcomings in personal job performance requirements and threats from animals and natural elements were among the top five causes.

According to the Accidents at Work Statistics [6], there were 3,347 fatal workplace accidents in the EU, with more than a fifth occurring in the construction sector in 2021. The total number of non-fatal accidents was 2.88 million, showing a significant increase from 2020 to 2021, which could be partly attributed to the relaxation of COVID-19 restrictions. Notably, men were more likely than women to have workplace accidents, largely due to the higher involvement of men in sectors like mining, manufacturing, and construction. The incidence rate of fatal accidents varied across EU Member States, with the highest rates in the Baltic states of Lithuania and Latvia [6].

The sectors of construction, transportation and storage, manufacturing, agriculture, forestry, and fishing accounted for the majority of fatal and non-fatal accidents in the EU in 2021. The most common types of injuries from these accidents were wounds and superficial injuries, dislocations, sprains and strains, concussions, and internal injuries [6]. These results are in line with those presented in the study by Ivascu and Cioca [7] who determine that the frequency and severity of workplace accidents vary significantly across different economic activities and that sectors like construction, manufacturing, transport, storage, agriculture, forestry, and fishing are more prone to fatal accidents due to their intensive risk nature. They also report that non-fatal accidents were prevalent in specific sectors like wholesale and retail trade, human health, social work activities, and public administration.

This study also highlights that annually around 3,500 workers lose their lives due to work accidents, and over 3 million work accidents result in absences of more than three

days. A significant portion of employees in the EU perceive their health as being at risk due to their work. This has led to substantial costs in terms of medical leave and social insurance, with some member states experiencing rising costs. [7]

A study by Vranješ et al. [8] emphasizes the importance of an effective strategy for utilizing performance indicators in the OHS management to address the challenges in the organization of the OHS system at the company level. These numerical indicators supply management with insights into past occurrences, identify current issues and obstacles in maintaining OHS and enable tracking progress towards safety objectives and overseeing the outcomes of companies in the occupational safety domain. They also serve as a tool for implementing occupational safety strategies effectively. In terms of company safety system success, the primary aim of these indicators is prevention. They offer crucial information about a company's status regarding occupational safety. Continuous monitoring of the working and living environment and the implementation of measures to alter the current situation and mitigate risks demand a systematic approach and the selection of suitable occupational safety performance indicators.

The comprehensive analysis by Jørgensen [9] highlights the complexity of workplace accidents in the EU, underscoring the need for diverse and targeted approaches to prevention and risk management. The study analyzed Eurostat data to identify which hazards and accidental events led to serious consequences. It aimed to prioritize prevention efforts and recommend suitable risk-reduction methods depending on the different hazards and accidental events. Accidents associated with complex sequences (major hazards) like electrical issues, explosions, and fires accounted for a smaller proportion (11.3%) of accidents. In contrast, minor hazards related to simpler events like body movements, slips, trips, and falls, and loss of control over machines and tools were more dominant. The study suggests that minor hazards require more awareness to reduce severe consequences, as simple accidental events which are part of daily working life could lead to serious consequences. [9]

The 2021 report by Kisser et al. [10] provides comprehensive insights into injuries within the EU from 2009 to 2018, based on the EU Injury Database. This database is a unique data source offering standardized, cross-national information on the external causes and circumstances of injuries treated in emergency departments. It aids in developing and evaluating injury prevention policies and programs to control external risks. The data complements statistics on deaths, hospital discharges, and specific surveillance systems for road and workplace accidents. The estimated yearly injury rate for the European Injury Database region (2009-2018) is approximately 80.10 per 1000 persons. This translates to about 7.8% of the European population requiring treatment in an emergency department annually. The data also provide an "injury pyramid", showing the distribution of injuries, hospital admissions, and fatalities due to injuries in the EU [10].

There are other studies investigating accidents at work across various countries, sectors, or types of injuries [11-15], presenting the key trends in the OHS.

These findings from various reports and studies illustrate the ongoing challenges in ensuring workplace safety across the EU, highlighting the need for continual improvement in OHS measures, especially in sectors with high accident rates and in addressing emerging risks due to technological and demographic changes.

3. Methodology and Data Analysis

On the basis of Framework Directive (89/391/EEC), the European Statistics on Accidents at Work (ESAW) project was launched in 1990, to harmonize data on accidents at work for all accidents resulting in more than three days' absence from work [16].

In ESAW methodology an accident at work is defined as a discrete occurrence during the course of work which leads to physical or mental harm. Fatal accidents at work are those that lead to the death of the victim within one year of the accident taking place, whereas non-fatal accidents at work are those that result in at least four full calendar days of absence from work (they are sometimes also called "serious accidents at work") [6]. Workplace accidents that do not result in fatalities can still lead to a significant loss of working days and often cause substantial distress for the affected workers and their families. These incidents can lead to severe consequences, such as living with a lifelong disability, being compelled to exit the workforce, or necessitating a change in occupation.

This paper employs data about fatal [17] and non-fatal [18] accidents at work from the Eurostat database covering the period 2010-2021 and EU-27 countries.

4. Discussion

According to the data presented in Table 1, there were 2.88 million non-fatal accidents that resulted in at least four calendar days of absence from work and 3,347 fatal accidents in the EU in 2021, a ratio of approximately 860 non-fatal accidents for every fatal accident [6].

The number of non-fatal accidents at work has been reduced in 2021, compared to 2010, although the number of accidents fluctuated during the analyzed period (Fig. 1). The average number of non-fatal accidents has been also reduced in the analyzed period resulting in 31,609 less injured workers in 2021 comparing to 2010. What is evident from Table 1 is that 6 countries exhibited an increase in the number of non-fatal accidents: Denmark, France, Latvia, Lithuania, Hungary and Sweden, whereas the number of accidents decreased in all other EU countries.

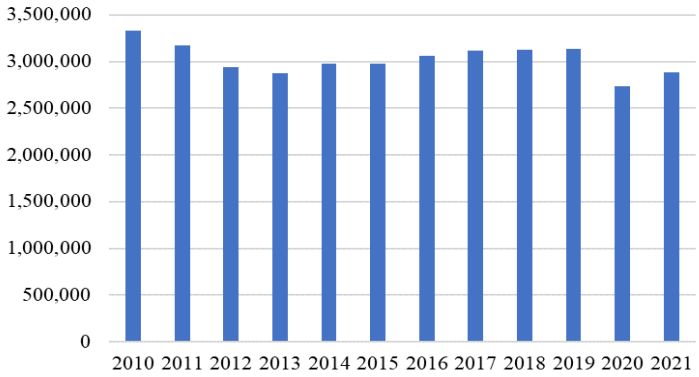

Fig. 1 The number of non-fatal accidents at work in the EU-27 for the period 2010-2021

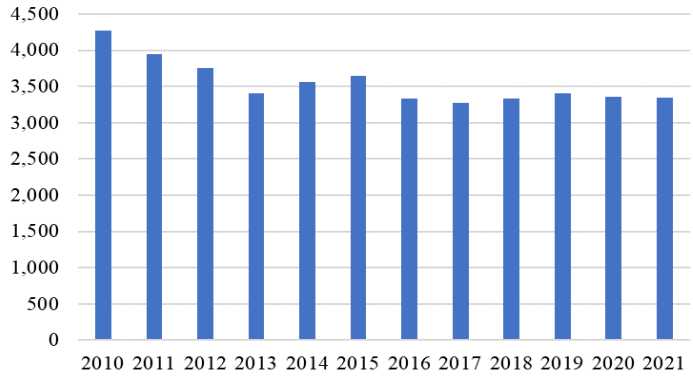

Fig. 2 The number of fatal accidents at work in the EU-27 for the period 2010-2021

Table 1 Accidents at work by NACE Rev. 2 activity in the EU countries

Country	Fatal		Change	Non-fatal		Change
	2010	2021	2010-2021	2010	2021	2010-2021
EU27 total	4,277	3,347	-930	3,329,031	2,886,507	-442,524
Belgium	74	47	-27	67,263	62,038	-5,225
Bulgaria	92	70	-22	2,331	1,953	-378
Czechia	121	88	-33	65,109	36,704	-28,405
Denmark	41	43	2	62,523	85,309	22,786
Germany	567	435	-132	930,447	810,127	-120,320
Estonia	17	13	-4	5,556	5,478	-78
Ireland	42	34	-8	19,294	16,505	-2,789
Greece	32	22	-10	15,461	4,476	-10,985
Spain	338	376	38	493,789	457,435	-36,354
France	537	674	137	592,992	655,024	62,032
Croatia	35	35	0	11,903	9,697	-2,206
Italy	718	601	-117	437,821	272,787	-165,034
Cyprus	19	5	-14	2,165	1,428	-737
Latvia	25	38	13	1,195	2,272	1,077
Lithuania	50	49	-1	2,266	4,483	2,217
Luxembourg	15	7	-8	6,983	6,474	-509
Hungary	96	82	-14	19,989	23,518	3,529
Malta	3	9	6	2,751	1,587	-1,164
Netherlands	79	25	-54	183,005	82,420	-100,585
Austria	182	105	-77	78,413	55,490	-22,923
Poland	446	220	-226	85,825	67,929	-17,896
Portugal	204	93	-111	130,271	113,976	-16,295
Romania	381	172	-209	3,722	2,779	-943
Slovenia	24	14	-10	16,367	14,197	-2,170
Slovakia	48	32	-16	9,126	8,050	-1,076
Finland	37	19	-18	48,263	36,994	-11,269
Sweden	54	39	-15	34,201	47,378	13,177
EU27 average	158	124	-34	237,788	206,179	-31,609

Source: Author based on the data from Eurostat [17-18]

The number of fatal accidents at work has also been reduced in 2021, compared to 2010, although the number of accidents fluctuated during the analyzed period (Fig. 2). The average number of fatal accidents has also reduced in the analyzed period resulting in 34 fewer injured workers in 2021 compared to 2010. What is evident from Table 1 is that 5 countries exhibited an increase in the number of fatal accidents: Denmark, Spain, France, Latvia, and Malta, whereas the number of accidents decreased in all other EU countries, except Croatia in which the number of fatal accidents remained the same.

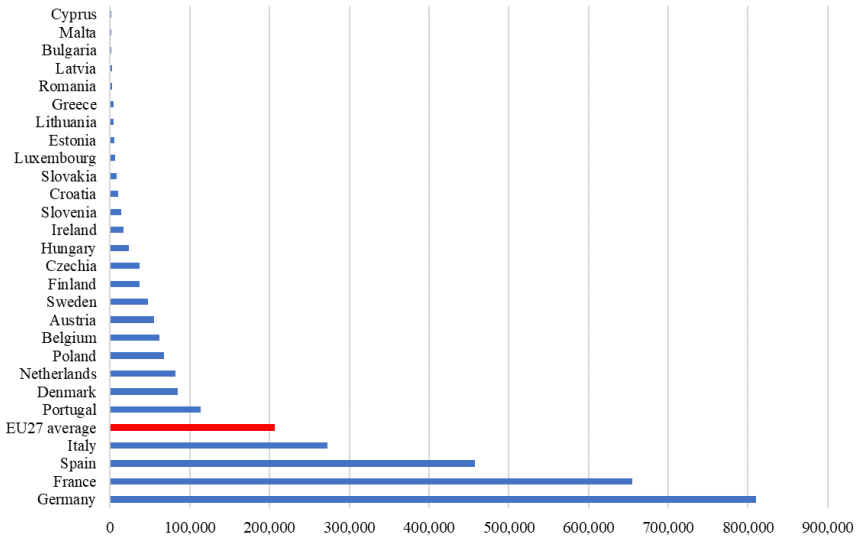

Fig. 3 The number of non-fatal accidents at work for EU-27 countries in 2021

From Fig. 3 it is evident the highest number of non-fatal accidents at work were reported in Germany, France, Spain and Italy, above the EU-27 average. Regarding fatal accidents at work (Fig. 4) situation is similar, as France, Italy, Germany and Spain also reported the number of fatal accidents above the EU-27 average. Two more countries Poland and Romania also reported the number of fatal accidents at work above the EU-27 average, although the number of non-fatal accidents in these countries is relatively small, especially in Romania.

Based on the analyzed data it is evident that in the EU there is a strong diversity among countries regarding the number of fatal and non-fatal accidents at work. According to the research conducted by EU-OSHA [19], it has been reported that the European economic costs of work-related accidents and illnesses are EUR 476 billion, which represents 3.3% of the European GDP, and the split of the costs between fatal and non-fatal cases is approximately equal.

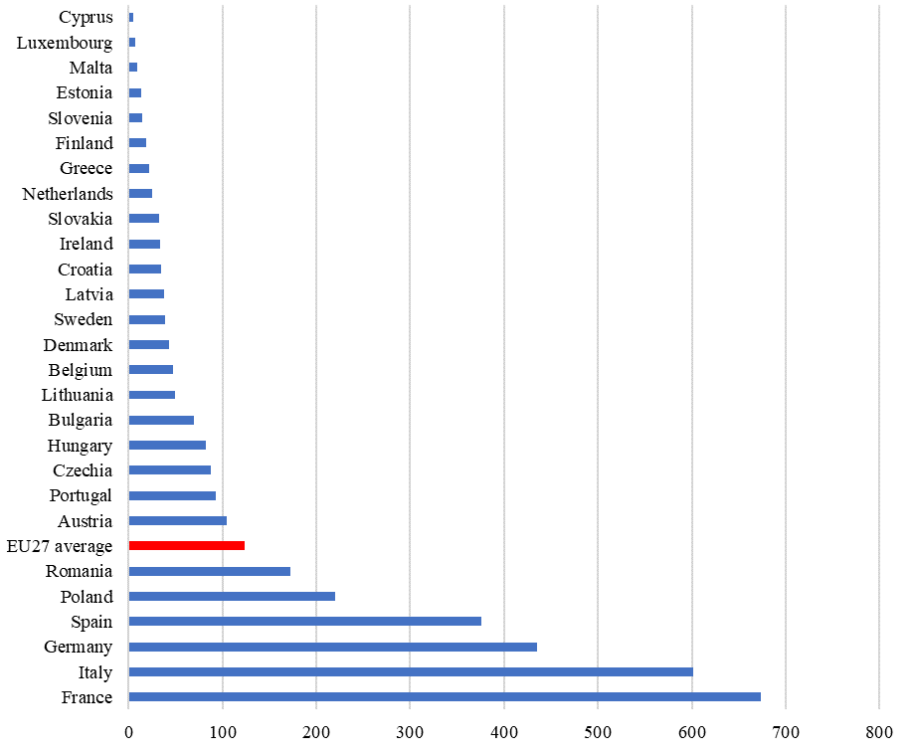

Fig. 4 The number of fatal accidents at work for EU-27 countries in 2021

5. CONCLUSION

This paper has provided a detailed analysis of accidents at work within the EU, highlighting their profound impact on both the health and safety of workers and the economic stability of member states. Through comprehensive data examination, it became evident that workplace accidents are not isolated incidents but rather reflect broader systemic issues. The economic implications of these accidents are significant, encompassing direct costs like medical care and rehabilitation, as well as indirect costs such as lost workdays and decreased productivity.

However, the study faces certain limitations. Firstly, the reliance on reported data may not capture the full extent of workplace accidents, as some incidents might go unreported. Secondly, the variability in reporting standards and practices across EU member states may lead to inconsistencies in data. Thirdly, the study predominantly focuses on physical accidents, with less emphasis on psychological or emotional impacts, which are equally critical.

Future research should aim to address these limitations by incorporating more qualitative data to understand the underlying causes of accidents better and explore the psychological impacts of workplace accidents. Additionally, research should focus on developing more standardized reporting practices across the EU to ensure consistency and accuracy in data collection. Also, it would be interesting to explore the EU database on occupational

diseases (although at the moment of writing the paper it is in the experimental phase), as well as the potential connection between work injuries and diseases. Finally, there is a need for ongoing evaluation of the effectiveness of current safety regulations and policies, with a view to continuously adapt and improve workplace safety standards.

This study underscores the need for proactive strategies and enhanced safety measures to prevent workplace accidents. By prioritizing worker safety and well-being, the EU can not only reduce the human and economic burden of these accidents but also contribute to more sustainable economic growth and social progress.

Acknowledgement: *This paper is part of the research done within the Bilateral Project Slovenia-Serbia (No. 337-00-110/2023-05/52), and is also supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (Agreement No. 451-03-47/2023-01/200148).*

REFERENCES

1. Coelho, D. A. (2020). Social, cultural and working conditions determinants of fatal and non-fatal occupational accidents in Europe. *Sigurnost*, *62*(3), 217-237.
2. Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31989L0391
3. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. EU Strategic Framework on Health and Safety at Work 2021-2027: Occupational safety and health in a changing world of work (COM/2021/323 final). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0323&qid=1626089672913#PP1Contents
4. EU-OSHA – European Agency for Safety and Health at Work, Occupational safety and health in Europe: state and trends 2023. https://osha.europa.eu/en/publications/occupational-safety-and-health-europe-state-and-trends-2023
5. Hollá, K., Ďad'ová, A., Hudáková, M., Valla, J., Cidlinová, A., & Osvaldová, L. M. (2023). Causes and circumstances of accidents at work in the European Union, Slovakia and Czech Republic. *Frontiers in public health*, *11*, 1118330.
6. EUROSTAT (2023). *Accidents at Work Statistics.* https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Accidents_at_work_statistics (accessed October 20, 2023)
7. Ivascu, L., & Cioca, L. I. (2019). Occupational accidents assessment by field of activity and investigation model for prevention and control. *Safety*, *5*(1), 12.
8. Vranješ, B., Vajkić, M., Haznadarević, L., Đapan, M., & Stojiljković, E. (2020). Trends in Occupational Injuries – An Occupational Safety Indicator in Forestry Sector of Bosnia and Herzegovina. *Facta Universitatis, Series: Working and Living Environmental Protection*, (1), 185-192.
9. Jørgensen, K. (2015). Serious work accidents and their causes - An analysis of data from Eurostat. *Safety Science Monitor*, *19*(2), Article-2.
10. Kisser, R., Giustini, M., Rogmans, W., Turner, S., Lyons, A. P., Valkenberg, H., & Safety, C. P. (2021). Injuries in the European Union 2009-2018. *EuroSafe (European Association for Injury Prevention and Safety Promotion)*.
11. Lombardi, M., Fargnoli, M., & Parise, G. (2019). Risk profiling from the European statistics on accidents at work (ESAW) accidents′ databases: A case study in construction sites. *International journal of environmental research and public health*, *16*(23), 4748.
12. Bundalevski, S. (2022). Unsafe Behavior among Employees in the Construction Industry. *Facta Universitatis, Series: Working and Living Environmental Protection*, 169-175.
13. Mitrevska, C., Bureska, L. J., Gruevska, N., & Zikovska, S. (2023). Statistical Indicators for Accidents at Work in the Construction Sector according to the Part of Body Injured and Types of Injuries. *Facta Universitatis, Series: Working and Living Environmental Protection*, 011-016.
14. Mitrevska, C., Mitrevska, E., & Mitrevski, V. (2022). Statistical Indicators for Accidents at Work in the Construction Sector. *Annals of the Faculty of Engineering Hunedoara*, *20*(1), 87-90.

15. Hoła, B., & Szóstak, M. (2015). Analysis of the state of the accident rate in the construction industry in European Union countries. *Archives of Civil Engineering*, *61*(4), 19-34.
16. European Commission (2013). *European Statistics on Accidents at Work (ESAW) — Summary methodology*. Luxembourg: Publications Office of the European Union, ISBN 978-92-79-28419-9, ISSN 1977-0375, doi:10.2785/40882
17. Eurostat (2023). Fatal Accidents at work by NACE Rev. 2 activity https://ec.europa.eu/eurostat/databrowser/view/hsw_n2_02/default/table?lang=en
18. Eurostat (2023). Non-fatal accidents at work by NACE Rev. 2 activity and sex https://ec.europa.eu/eurostat/databrowser/view/hsw_n2_01/default/table?lang=en
19. EU-OSHA – European Agency for Safety and Health at Work. An international comparison of the cost of work-related accidents and illnesses. 2017. https://osha.europa.eu/sites/default/files/2021-11/international_comparison-of_costs_work_related_accidents.pdf

ANALIZA NEZGODA NA RADU U EVROPSKOJ UNIJI

Nezgode na radu predstavljaju kritično pitanje unutar Evropske unije (EU), utičući ne samo na zdravlje i bezbednost miliona radnika već i na ekonomsku stabilnost i produktivnost država članica. Statistički podaci o nezgodama na radu su važni za određivanje najproblematičnijih sektora u kojima dolazi do povreda sa smrtnim ishodom. EU, sa svojim raznovrsnim industrijama i obimnom radnom snagom, predstavlja jedinstven kontekst za proučavanje nezgoda na radu. Ovi incidenti variraju od manjih povreda do velikih katastrofa, utičući na različite sektore, kao što su proizvodnja, građevinarstvo i usluge. Posledice takvih nezgoda su dalekosežne, i protežu se izvan neposredne fizičke štete za radnike. One obuhvataju značajne ekonomske dimenzije, uključujući direktne troškove kao što su medicinska nega i rehabilitacija, i indirektne troškove kao što su izgubljeni radni dani, smanjena produktivnost i zahtevi za odštetom, čime se stavlja značajan pritisak na preduzeća, zdravstvene sisteme i nacionalne ekonomije. Cilj rada je da pruži sveobuhvatan pregled nezgoda na radu u EU, naglašavajući njihov ekonomski značaj. Pružajući holistički pogled na nezgode na radu u EU, rad naglašava hitnu potrebu za poboljšanjem mera bezbednosti i proaktivnim strategijama za stvaranje sigurnijeg radnog okruženja, doprinoseći u krajnjem slučaju održivijem ekonomskom rastu i blagostanju radnika.

Ključne reči: *nezgode na radu, zdravlje i bezbednost na radu, Evropska unija, statistički podaci, ekonomski aspekti*