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UKRAINE'S STATE POLICY IN THE FIELD OF OCCUPATIONAL SAFETY AND HEALTH IN THE CONTEXT OF EUROPEAN INTEGRATION

Purpose. To assess the level of harmonization of Ukrainian labor protection legislation with EU directives and ILO standards, identify systemic gaps in reform efforts, and develop an analytical model for quantitatively evaluating the readiness of the national occupational safety and health system to meet EU-27 standards.

Methodology. A comparative method was applied to compare the provisions of domestic labor law with Directives 89/391/EEC, 89/654/EEC, 2009/104/EU, and ILO Conventions Nos. 155, 161, and 187; a structural-functional approach was used to analyze the coordination of activities between the Ministry of Social Policy, the State Labor Service, and the Ministry of Health. The integrated harmonization index (I_{harm}) was constructed using the weighted aggregation method of five normalized sub-indices (AHP, $CR = 0.07$); normalization was performed using the min-max method within the range from the 2013 level to the EU-27 standard. The coefficients of the adjusted injury rate R_{adj} ($\alpha = 0.35$; $\beta = 0.42$) were calibrated using OLS based on data from 2016–2024 and regression analysis of panel data from 10 CEE countries (EU-OSHA/Eurostat, 2004–2015).

Findings. Ukraine is at an intermediate level of harmonization ($I_{harm} \approx 0.52$–0.54), which corresponds to an active but incomplete phase of reform. The greatest gaps were recorded in the sub-indices of law enforcement ($E \approx 0.29$) and safety culture ($C \approx 0.41$). Martial law conditions led to the suspension of scheduled inspections and an underestimation of official statistics: R_{adj} exceeds the registered level by an average of 1.35 times. The key provisions of the new Law "On Occupational Safety and Health" are outlined: full employer liability (Article 4), the hierarchy of risk prevention (Article 14), independent OSH services (Article 15), external audits for high-risk industries (Article 18), and protection of vulnerable groups (Article 28).

Originality. The authors have developed the I_{harm} model based on five weighted sub-indices (legislative harmonization, institutional capacity, safety culture, law enforcement, and digitalization) and proposed an adjusted indicator, R_{adj}, that accounts for the impact of martial law.

Practical value. The I_{harm} model enables sector-specific monitoring of harmonization progress in industry, construction, agriculture, and the service sectors; allows for the concentration of inspection and training resources where the gap from EU standards is greatest; and serves as a regulatory planning tool for achieving EU-27 standards by 2030.

Keywords: *occupational safety, European integration, harmonization of legislation, EU directives, harmonization index*

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Introduction. The state of occupational safety and health in Ukraine remains one of the most pressing socioeconomic challenges, directly affecting the country's labor force, the competitiveness of its economy, and its prospects for European integration. Despite the declared reform agenda, the rate of workplace injuries in Ukraine significantly exceeds that of EU member states, and a significant portion of accidents remains unreported due to flawed reporting and enforcement mechanisms.

The key contradiction lies in the gap between formal progress in legislative harmonization and the actual state of workplace safety. The Association Agreement between Ukraine and the EU obliges the state to implement framework directives in the field of occupational safety and health, primarily Directive 89/391/EEC, which establishes the principle of employer responsibility and a risk-based approach to safety management. At the same time, most domestic enterprises continue to operate according to the logic of the Soviet regulatory tradition – reactive response to incidents rather than preventive risk management. This creates legal conflicts between current legislation and practice and slows down the institutional strengthening of the occupational safety system.

The conditions of full-scale war further exacerbate the problem. The suspension of routine inspections by the State Labor Service, the reallocation of state resources toward defense priorities, and structural changes in the labor market significantly weaken regulatory oversight. At the same time, new categories of occupational hazards are emerging – ranging from direct mili-

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tary risks to the psychosocial strain on critical infrastructure workers – which current legislation is unable to adequately address.

The failure to ratify ILO Convention No. 187 on the Framework for Promoting Occupational Safety and Health, the controversial nature of Bill No. 10147, criticized by trade unions and EU bodies for potentially shifting responsibility onto workers, as well as the lack of a unified quantitative toolkit for assessing the progress of reforms, indicate that Ukraine has not yet formulated a comprehensive, measurable strategy for transitioning to EU standards in this area.

Therefore, in the context of ongoing European integration and the military-economic crisis, there is a need for a comprehensive study of the state of harmonization of occupational safety legislation, an analysis of institutional and legal gaps in the reform process, and the development of analytical tools for the quantitative assessment of the readiness of the national occupational safety system to meet EU-27 standards.

Literature review. The issue of reforming occupational safety and health (OSH) systems in the context of European integration is the subject of active international debate, unfolding across three interrelated dimensions: the effectiveness of regulatory interventions, a systemic rethinking of OSH principles, and the adaptation of legislation in the context of a military crisis.

At the global level, the key issue is the measurability of reform outcomes. Vitrano and Micheli [1] note that despite the growing number of regulatory interventions in the field of occupational safety and health, the evidence base for their effectiveness remains extremely limited due to the heterogeneity of evaluation methodologies. This conclusion is supported by a systematic review by Bondebjerg, et al. [2], which, covering over 200 studies, identified significant gaps in the evidence base for regulatory interventions and called for unified evaluation protocols – precisely the methodological gap that this project aims to fill with regard to Ukraine. Takala, et al. [3] emphasize that the global burden of occupational diseases and injuries in 2019 reached 1.9 million deaths, with the highest rates recorded precisely in countries with transition economies – a context that is fundamentally important for understanding the scale of the problem in Ukraine.

At the conceptual level, two competing positions can be identified. Felknor, et al. [4] propose four scenarios for the future of occupational safety and health and emphasize that without a shift from reactive compliance to preventive risk management, no country will achieve an effective occupational safety system. This conceptually echoes the position of Pandey [5], who advocates a systematic approach that integrates organizational, technological, and psychosocial factors. It is fundamentally important that both works rely on Framework Directive 89/391/EEC as a normative benchmark – the very document whose compliance serves as a key sub-index of the Iharm model we propose. At the same time, the European Commission [6] specifies the chemical dimension of occupational safety within the context of the EU Strategic Framework 2021–2027, emphasizing that candidate countries face a significantly greater gap between regulatory requirements and practice than member states. Waddell, et al. [7] systematically evaluate organizational interventions regarding psychosocial risks and conclude that their effectiveness is limited in the absence of systematic enforcement, which directly correlates with low values of sub-indices E and C in our model.

A distinct field of research has emerged regarding the adaptation of Ukraine's labor legislation to EU standards. Kiselyova, et al. [8] analyze the implementation of EU standards in the labor sphere during the drafting of the new Labor Code and establish that the key barrier is not the technical incompatibility of norms, but the absence of effective enforcement mechanisms – a conclusion that contradicts the position in [7], which emphasizes legislative gaps. Yaroshenko, et al. [9] and Yaroshenko, et al. [10] explore, respectively, the legal dimensions of remote work and the protection of labor rights in the context of armed conflict under international humanitarian law, thereby establishing an important comparative framework. Denysiuk, et al. [11] examine the reform of occupational safety standards in the process of European integration, though they limit themselves to a descriptive analysis of regulatory changes without quantitative verification.

Quantitative risk modeling is a distinct area where Ukrainian researchers demonstrate methodological maturity. Bochkovskyi [12] develops stochastic models for the comprehensive assessment of occupational risks and establishes that their reliability fundamentally depends on the quality of input data – the very same latency problem that we address using the Radj index. Tsopa, et al. [13] analyze the regulatory framework for occupational risks in the context of Bill No. 10147 and identify the same systemic contradictions regarding employer liability that were criticized by IndustriALL and the ILO.

The domestic academic discourse in the legal sphere is represented by several key positions. Ivchuk [14, 15] examines occupational safety and health principles and gaps in the acquis communautaire within national legislation – instability, inconsistency, and a lack of systematic norms – but, unlike Kiselyova, et al. [8], does not propose quantitative criteria for assessing progress. Inshyn and Yaroshenko [16] justify the codification of labor legislation through the new Labor Code and emphasize the role of contractual agreements. Kostyuchenko [17] stresses that without an update to state social policy, formal harmonization will not be accompanied by real improvements in working conditions – a thesis consistent with the conclusions [4] regarding the systemic prerequisites for the effectiveness of reforms.

Baik, et al. [18] examine government regulation of the labor market in times of crisis, specifically the impact of military operations on the restructuring of demand for occupations, but do not explore the link between labor market regulation and occupational safety standards – a gap that is partially filled by [10]. Garmash, et al. [19] justify the need for a law on industrial safety audits, which directly echoes the provisions of Article 18 of the new Law "On Occupational Safety and Health". Chizhmar [20] establishes the compliance of national labor law norms with EU standards but, unlike [1, 2], does not apply quantitative evaluation criteria. Shabanov [21] emphasizes that temporary restrictions on workers' rights under martial law are justified but do not negate the strategic goal of harmonization – a con-

clusion that complements the rights-based approach [10]. Stasiv [22] identifies internal constitutional conflicts in the field of occupational safety and health and insists on a transition from the Soviet concept to a modern model of occupational safety and health, which conceptually aligns with the systemic approach [5]. Khursenko, et al. [23] propose an algorithm for preventive measures based on digitalization, yet acknowledge the limitations of the empirical base – a shortcoming shared by most studies identified in [2]. Shevchenko, et al. [24] explore the concepts of decent work and social protection, respectively, thereby establishing an important normative and value-based context.

Thus, an analysis of the sources reveals three key contradictions in the scientific discourse. First, a comparison of international [1, 2] and domestic [20, 24] studies demonstrates that descriptions of normative gaps significantly outweigh their quantitative measurement. Second, the position regarding the nature of the main barrier to reform is debatable: while [20, 24] emphasize legislative inconsistency, [4 and 8] convincingly argue that the lack of law enforcement is a primary, rather than a secondary, factor in stagnation. Third, none of the analyzed studies proposed a verified quantitative tool for comprehensively measuring the readiness of the OSH system to meet EU standards in conditions of armed conflict. It is precisely this gap that defines the scientific novelty and practical value of the proposed Iharm model.

Purpose. The purpose of this article is to examine the state of harmonization of domestic occupational safety and health legislation with EU and ILO standards and to develop a toolkit for the quantitative assessment of the national occupational safety and health system's readiness for European integration standards.

Objectives are: to determine the degree of compliance of current legislation with key EU directives and ILO conventions; to analyze the institutional capacity of state occupational safety and health authorities; to construct an integrated harmonization index based on weighted sub-indices; to propose an adjusted occupational injury rate taking into account the impact of martial law; to identify priority areas for addressing legal and regulatory gaps to achieve EU-27 standards by 2030.

Methodology. The study was conducted using a combination of general scientific and specialized legal approaches, each of which performed a clearly defined function within the research framework.

Sources of empirical data. The empirical basis of the study was formed based on five categories of sources. First, official statistics on workplace injuries from the State Labor Service of Ukraine for 2013–2024 (annual reports of the State Labor Service), which were used as primary data to calculate the baseline indicator Rbase. Second, materials from the monitoring reports of the Council of Europe's Committee on Social Rights regarding Ukraine for 2021 and 2024 (Conclusions 2021 and RAP-RCHA-UKR-15-2024), which served as a source for assessing the sub-indices of legislative harmonization (L) and law enforcement (E). Third, reports by the European Commission on Ukraine's progress in fulfilling its obligations under the Association Agreement (Ukraine Report 2025, DG NEAR), from which the scores for the transposition of specific directives were extracted. Fourth, analytical data from EU-OSHA and Eurostat on average occupational safety indicators in the EU-27 during the relevant period, which were used as target values Xmax during normalization. Fifth, data from the International Labour Organization (ILOSTAT) and materials from ratification procedures for assessing the institutional capacity sub-index (I).

Subindex Formation Procedure. Each of the five subindices was formed by aggregating three to five quantitative indicators. The legislative harmonization subindex (L) is calculated as the weighted average of the proportion of directives and conventions for which full or partial transposition has been achieved (0 – not transposed, 0.5 – partial transposition, 1.0 – full transposition), covering 89/391/EEC, 89/654/EEC, 2009/104/EU, and Conventions Nos. 155, 161, and 187. The institutional capacity sub-index (I) aggregated: the staffing ratio of the State Labor Inspectorate (the ratio of actual staff to authorized strength), the proportion of enterprises covered by inspections, and the existence of interagency coordination protocols. The safety culture sub-index (C) was based on a normalized indicator of the proportion of enterprises voluntarily conducting risk assessments, as well as the results of employer surveys (EU-OSHA ESENER-3 data, 2023). The Enforcement Subindex (E) was calculated using three indicators: the number of inspections per 10,000 employees, the percentage of issued orders complied with, and the level of latent occupational injuries, assessed using ILO methodology. The digitalization subindex (D) reflects the coverage of the "Diia" portal's declarative system and the existence of electronic document flow between the State Labor Service and employers. A comparison of domestic labor law provisions with the acquis communautaire was conducted using a comparative method. A structural-functional approach was applied to assess coordination and interaction between administrative bodies.

Substantiation of weight coefficients. Weight coefficients (w_1–w_5) were determined using the Analytic Hierarchy Process (AHP) in accordance with the priorities of European integration reform. The pairwise comparison matrix was verified by two independent experts – a representative of the State Labor Service and a labor law specialist. Subindex L received the highest weight ($w_1 = 0.30$), as the formal transposition of directives is a necessary condition for any further progress and is directly assessed by the European Commission in reports on the implementation of the Association Agreement. Subindex I ($w_2 = 0.25$) ranked second, reflecting the key role of the State Labor Service and the Ministry of Social Policy in the practical implementation of the regulations. Subindex C ($w_3 = 0.20$) was considered as a medium-term factor: without a change in employers' behavior, the regulations remain merely declarative. Subindex E ($w_4 = 0.15$) was assigned a lower weight because, under martial law, inspection activity is objectively limited, though it has not disappeared as a criterion of readiness. Subindex D ($w_5 = 0.10$) received the lowest weight as the newest component of the system, which is in the initial stage of implementation. The consistency index of the AHP matrix was $CR = 0.07$, which corresponds to the acceptable threshold of ≤ 0.10.

Methodology *for calibrating model parameters.* The coefficient α (the impact of martial law) was calibrated using data from three years of full-scale aggression (2022–2024) via the least squares method: the basis was the deviation of officially recorded accidents from the forecast trend, extrapolated from the pre-war series of 2016–2021. The calculation showed that the actual injury rate exceeds the registered rate by an average of 1.35 times (i.e., $\alpha = 0.35$), which is consistent with ILO estimates of the proportion of unreported accidents in countries with limited inspection oversight (range 25–45 %). The β coefficient (OSH system effectiveness) was determined using panel data regression analysis for 10 Central and Eastern European countries that underwent a similar harmonization process in 2004–2015 (Eurostat and EU-OSHA data): it was found that a 0.1-unit increase in the integrated harmonization index is associated with a reduction in the adjusted injury rate of approximately 4.2 %, which is recorded as $\beta = 0.42$. All indicators were normalized using the min-max method within the range from the 2013 level (X_{min} – base year, prior to the signing of the Association Agreement) to the EU-27 average standard (X_{max} – 2030 target benchmark). The causal relationships between the conditions of martial law and the weakening of state control were revealed using an abstract-logical method. The value-based justification for directions to improve the regulatory framework was carried out on the basis of an axiological approach.

Results. Ukraine's occupational safety and health system is undergoing transformation amid the simultaneous impact of three structural pressures: European integration commitments under the Association Agreement, the legacy of the Soviet regulatory tradition, and unprecedented wartime restrictions. A key indicator of the reform's incompleteness is the gap between formal progress in transposition and the actual state of safety: the standardized accident frequency rate in Ukraine in 2021 was 4.2 per 100,000 employed persons, while the EU-27 average was 1.7 (Eurostat, hsw_mi01), meaning a twofold lag despite formally harmonized legislation. Following the 2014 Revolution of Dignity, Ukraine launched a systematic reform toward a risk-based approach, as enshrined in Framework Directive 89/391/EEC, which emphasizes employer responsibility, risk assessment, and preventive management – in contrast to the reactive Soviet model of compliance with regulations. The reform process focuses on the transition from a traditional compliance-based approach to a modern risk-oriented system that emphasizes prevention, employer responsibility, and continuous improvement of workplace safety standards. It is important to note, however, that the mere existence of new regulations does not guarantee a reduction in workplace injuries: as demonstrated by the experience of CEE countries following their accession to the EU in 2004, the actual reduction in workplace accidents occurred with an average lag of 3–5 years after the entry into force of national legislation transposing the directive requirements (EU-OSHA, ESENER-2, 2013). This conclusion serves as a fundamental guideline for assessing the current state of reforms in Ukraine and directly justifies the need for the quantitative monitoring tool proposed in this study. Thus, an effective occupational safety and health policy is necessary not only for the protection of workers but also for economic competitiveness and the pursuit of European integration. The reform process focuses on the transition from a traditional compliance-based approach to a modern risk-based system that emphasizes prevention, employer responsibility, and the continuous improvement of workplace safety standards [25].

The importance of European integration for the development of OSH policy in Ukraine cannot be overstated, as it has provided both the foundation and the impetus for comprehensive legislative and institutional reforms. The EU-Ukraine Association Agreement is a foundational document that obligates Ukraine to harmonize its occupational safety and health legislation with EU directives and ILO standards, establishing specific requirements regarding workplace protection, working time limits, and anti-discrimination measures. This integration process has facilitated the adoption of key EU directives, including 89/391/EEC (Framework Directive), 89/654/EEC (Workplace Requirements), 89/656/EEC (personal protective equipment), 2009/104/EC (work equipment), and 92/57/EEC (construction sites), and has also facilitated the ratification of important ILO conventions, such as No. 155 on occupational safety and health and No. 161 on occupational safety and health services. Thus, European integration has provided Ukraine with a roadmap for modernizing its occupational safety and health system, while ensuring compatibility with the best international practices and standards [25].

The historical context of the occupational safety and health reforms, which will continue through 2024, reflects a systematic approach to policy transformation based on two fundamental documents that have charted the course of Ukraine's modernization. The EU-Ukraine Association Agreement, signed following the 2014 Revolution of Dignity, established the legal and political framework for bringing Ukrainian occupational safety and health legislation into line with European standards, creating binding commitments regarding legislative harmonization and institutional reform. Building on this foundation, the Cabinet of Ministers' 2018 Concept for OSH Management Reform, approved by Order No. 989-r, provided an operational plan for implementing these commitments through a comprehensive Action Plan that emphasizes risk-based approaches, preventive measures, and stakeholder engagement. This reform engaged central executive bodies, trade unions, and social insurance institutions in drafting new legislation, revising existing regulations, and establishing modern workplace safety requirements, although implementation challenges remain, as evidenced by high rates of workplace injuries and occupational diseases [26].

The reform trajectory from 2018 to 2024 demonstrated significant progress in legislative development and institutional capacity building, notably including the reinstatement of the "Occupational Safety and Health" major in higher education and the establishment of scientific commissions to develop occupational safety and health standards. The key milestones included the implementation of EU directives through ministerial orders, the ratification of a number of ILO conventions, and the ongoing efforts of social partners to advance an occupational safety and health bill addressing new work-

place challenges, including the protection of veterans and responses to wartime conditions. Despite these achievements, the reform process continues to face implementation challenges, particularly in ensuring employer compliance and addressing the full range of occupational risks, including psychosocial hazards, underscoring the ongoing need for sustained political commitment and institutional strengthening to achieve the full objectives of European integration (Fig. 1) [26].

The Ministry of Social Policy, Family, and Unity is the primary government body responsible for shaping occupational safety and health policy within Ukraine's broader social protection system, although its specific functions in this area have changed significantly as a result of recent reforms. The Ministry oversees overarching social protection priorities, including the modernization of social protection principles and the development of social services, but its direct involvement in occupational safety and health policy-making has been reorganized in accordance with Ukraine's new Law "On Occupational Safety and Health". The policy-making process now emphasizes employer responsibility and risk-based management systems, while the Cabinet of Ministers is tasked with establishing future requirements for occupational safety services and specialists through the development of regulations. This change reflects the goal of European integration – a shift from centralized state control to a system that empowers employers while maintaining appropriate state oversight and standard-setting functions [26].

The State Labor Service (SLS) serves as the primary body responsible for monitoring compliance with legislation and ensuring its enforcement in Ukraine, conducting inspections, investigating accidents, and ensuring adherence to occupational safety and health regulations across all sectors of the economy. Under the current conditions of martial law, the SLS operates primarily through unscheduled inspections conducted in response to worker complaints, union grievances, accidents, occupational diseases, or fatalities, while scheduled inspections have been suspended pursuant to Cabinet of Ministers Resolution No. 303 and Law No. 877. The service's enforcement powers include issuing mandatory orders to remedy violations with individual deadlines for compliance, conducting accident investigations with the preparation of mandatory reports, and imposing fines in accordance with Article 265 of the Labor Code, although enforcement mechanisms have been relaxed during martial law. The SLS maintains coordination mechanisms with military administrations, the Prime Minister's Office, and other government agencies to ensure comprehensive coverage of workplace safety issues, despite the operational constraints imposed by wartime conditions (Fig. 2) [27].

A general overview of these bodies, their functions, and their role in European integration is provided below (Table 1) (Baker McKenzie).

Inter-agency coordination mechanisms reflect a systematic approach to supporting the goals of European integration through a clear division of responsibilities

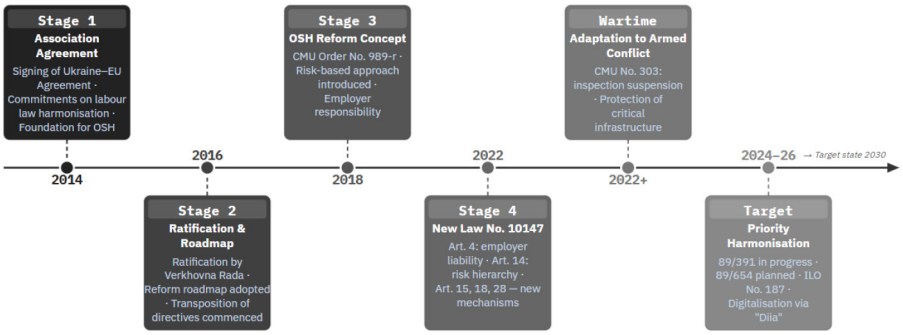

Fig. 1. Stages of harmonizing Ukraine's occupational safety and health legislation with EU and ILO requirements

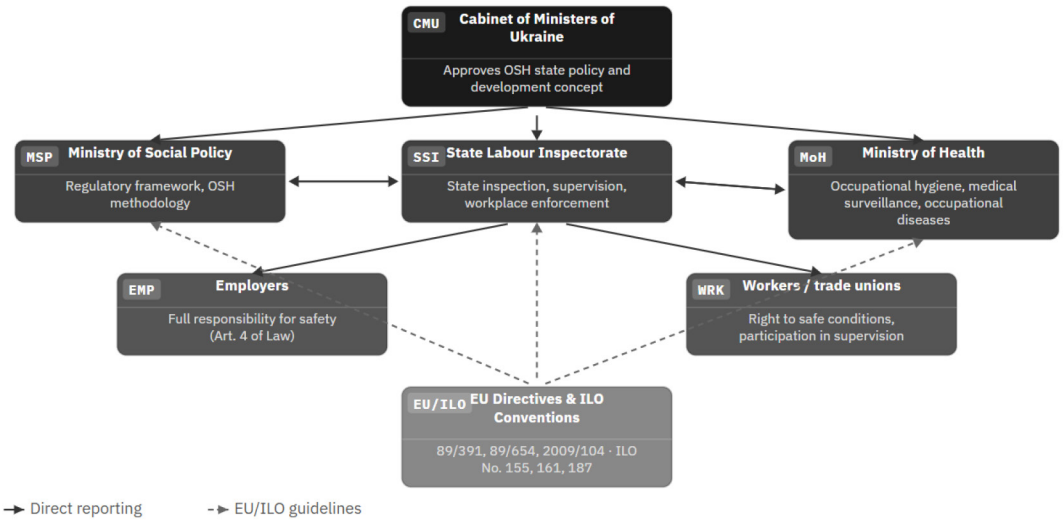

Fig. 2. Institutional structure of occupational safety and health governance in Ukraine

Table 1

Institutional structure of state policy in the field of occupational safety and health and its role in European integration

Authority	Main Functions	Key Powers	Role in the European Integration Process
Ministry of Social Policy	Formulation of occupational safety policy, coordination of social protection	Development of regulatory acts, setting standards	Alignment of national policy with EU directives
State Labor Service	Enforcement of legislation, inspections, investigations	Issuing orders, imposing fines, investigating accidents	Ensuring compliance with EU safety standards
Cabinet of Ministers of Ukraine	Strategic guidance, approval of regulatory acts	Establishing requirements for occupational safety services	Coordination of the implementation of EU directives
Ministry of Health	Development of occupational health standards	Formation of lists of hazardous factors for vulnerable groups	Ensuring medical aspects of compliance with EU occupational safety directives

and a framework for cooperation. The institutional structure emphasizes horizontal coordination between the policy-making functions of the Ministry of Social Policy and the law enforcement functions of the State Employment Service, while vertical coordination ensures the effective implementation of strategic decisions made at the Cabinet of Ministers level at the operational level. This coordination is carried out through interagency cooperation protocols, joint working groups on the implementation of EU directives, and shared responsibility for developing a regulatory framework that complies with European standards. The system supports European integration by ensuring that policy development, standard-setting, and enforcement measures align with EU directives such as 89/391/EC, while maintaining the flexibility necessary to address Ukraine's specific challenges, including wartime conditions and the transition from Soviet-era regulatory approaches to modern risk-based management systems. The legal framework enabling this institutional system to function in accordance with EU standards is the new framework law on occupational safety and health [28].

An analytical assessment of institutional capacity reveals a significant lag behind EU benchmarks. According to the State Labor Service, as of 2023, the actual number of state labor inspectors was approximately 1,200, while the statutory requirement was over 2,000, meaning the staffing level did not exceed 60 %. Compared to Poland at the start of its European integration path (2004), where this figure stood at 78 %, or to the current EU-27 average (92 %), Ukraine's inspection capacity is critically insufficient. The share of enterprises covered by scheduled inspections decreased from 18 % in 2019 to less than 4 % in 2023 due to the wartime moratorium (CMU Resolution No. 303). These figures directly determine the low estimated value of sub-index $I \approx 0.38$ in the Iharm model and confirm the conclusions [8] that the lack of enforcement is a primary, rather than a secondary, barrier to reform.

The new Law on Occupational Safety and Health (Resolution of the Verkhovna Rada of Ukraine No. 3912-IX of August 21, 2024) represents a fundamental transformation of Ukraine's approach to occupational safety and health, establishing a comprehensive legal framework that complies with European Union standards and International Labour Organization conventions. This legislation forms the foundation of OSH reform in Ukraine, introducing modern risk-based management principles that shift responsibility from state oversight to the employer, while maintaining robust protection for workers. The law covers all sectors, including private, public, cooperative, and social enterprises, creating a unified approach to workplace safety that replaces the fragmented regulatory system of the Soviet era. By establishing clear legal obligations, enforcement mechanisms, and protection standards, this law lays the foundation for Ukraine's integration into the European occupational safety and health framework, while addressing the country's specific challenges related to workplace hazards and industrial challenges.

Article 4 of the new law establishes the principle of full employer responsibility for creating and maintaining safe working conditions, which represents a paradigm shift compared to the previous system, where responsibility for safety was shared between employers and government agencies. Under this provision, employers bear full responsibility for identifying workplace hazards, taking preventive measures, providing necessary protective equipment, and ensuring that all types of work activities comply with established safety standards. This responsibility extends to all aspects of the work environment, including physical conditions, equipment safety, training, and health monitoring, with employers required to demonstrate proactive management rather than reactive compliance. The principle of full responsibility aligns with EU Directive 89/391/EEC, which emphasizes employers' obligations by establishing clear legal liability that can be enforced through inspections, fines, and civil liability mechanisms.

The hierarchy of risk prevention set forth in Article 14 establishes a systematic approach to occupational risk management that prioritizes elimination and control measures in accordance with internationally recognized best practices. This hierarchy requires employers to implement control measures in a specific order: first, avoiding and assessing risks at their source; then, adapting working conditions to minimize risks; replacing hazardous equipment and processes with safer alternatives; developing comprehensive occupational risk prevention policies; prioritizing collective protective measures over individual protective equipment; and, finally, ensuring that workers are properly informed and trained [29]. This structured approach reflects the European Union's prevention-oriented philosophy and moves away from traditional reactive safety measures in favor of proactive risk management, which eliminates hazards before they

can cause harm to workers (Fig. 3) (Council of the European Union (1989). 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; Law of Ukraine No. 3912-IX).

The law requires the establishment of independent occupational safety and health services through Article 15, which requires that occupational safety and health services and designated safety inspectors maintain complete professional independence from the influence or interference of the employer. These services, including an authorized occupational safety unit and an occupational safety engineer who performs the functions of a designated occupational safety inspector, must operate with full autonomy to ensure an objective assessment of hazards, impartial safety recommendations, and effective protection of workers' rights. The requirement for independence prevents conflicts of interest that could compromise safety decisions and ensures that occupational safety specialists can perform their duties without fear of retaliation by the employer or pressure to downplay safety concerns. The Cabinet of Ministers is tasked with establishing detailed requirements for these services, including qualifications, operational procedures, and performance standards that support their independent functioning (Law of Ukraine No. 3912-IX).

The external audit requirements for high-risk work, established by Article 18, introduce an additional level of safety oversight, ensuring an independent verification of the employer's compliance with occupational safety standards. Organizations engaged in high-risk activities must undergo periodic external audits conducted by qualified companies that possess the necessary documentation and authority, with the frequency of audits and specific requirements determined by a resolution of the Cabinet of Ministers. These audits provide an objective assessment of safety management systems, the effectiveness of hazard control, and compliance with regulatory requirements, as well as offer recommendations for improvement and identify potential risks that internal systems may overlook. The external audit mechanism reflects best European practices in safety management and provides employees, regulatory authorities, and stakeholders with an independent assurance that high-risk operations meet established safety standards (Law of Ukraine No. 3912-IX).

Regulations on flexible employee training allow employers to determine the appropriate frequency and methods of training, while maintaining mandatory requirements for safety instruction and competency development. This approach recognizes that different workplaces have different training needs depending on their specific hazards, the complexity of operations, and workforce characteristics, while ensuring that all employees receive adequate training to perform their work safely. Employers must conduct regular safety briefings and provide comprehensive training that prioritizes risk prevention principles, with the flexibility to adapt training programs to their operational requirements, except for high-risk work, the frequency of which is established by government regulation. Training programs must cover hazard identification, safe work procedures, emergency response, and the proper use of protective equipment, and employers are required to suspend employees who do not meet the requirements from work without pay until they complete the relevant training [30].

Article 28 introduces innovative protective measures for vulnerable groups, including pregnant workers, women who have recently given birth, and breastfeeding mothers, establishing for the first time in Ukrainian legislation clear restrictions on exposure to hazardous factors in the workplace. These employees are prohibited from being exposed to hazardous factors listed by the Ministry of Health and have the right to refuse to perform such work tasks, while employers are required to provide them with alternative positions based on medical recommendations or paid leave if no suitable alternatives are available. The law also guarantees paid leave

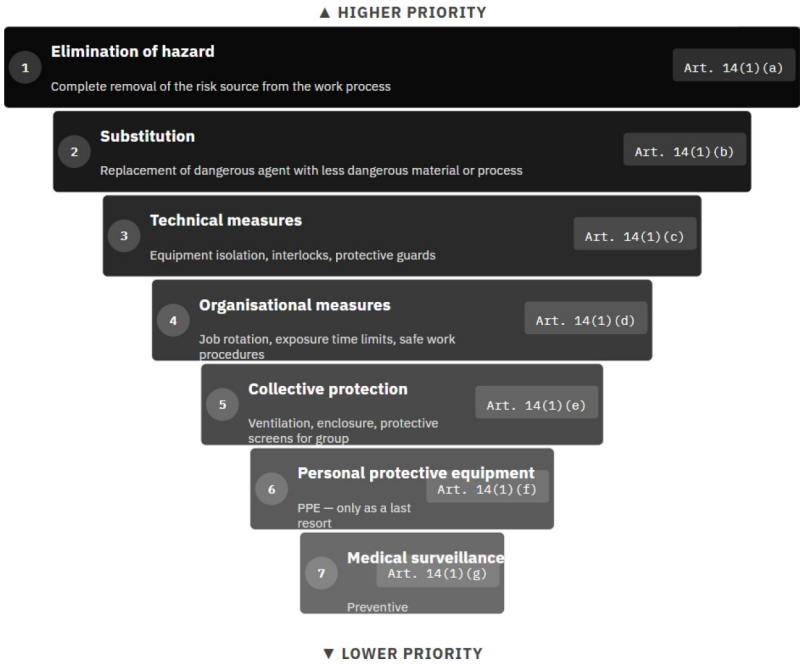

Fig. 3. Risk Prevention hierarchy in occupational safety system according to article 14 of the Law and Directive 89/391/EEC

for prenatal examinations and expands protections, including a ban on night shifts, overtime, weekend work, and business travel for pregnant women and mothers of young children. These provisions reflect European Union standards for the protection of vulnerable workers, ensuring that pregnancy and childcare responsibilities do not lead to discrimination in employment or economic hardship (Law of Ukraine No. 3912-IX).

The implementation of EU Directive 89/654/EEC on workplace requirements and Directive 2009/104/EC on work equipment was carried out through the adoption of specific orders by the Ministry of Social Policy, which establish detailed technical standards regarding workplace design, equipment safety, and operating procedures. Directive 2009/104/EC was implemented through orders concerning equipment safety requirements, which ensure that work equipment complies with European standards for design, installation, maintenance, and operation. Meanwhile, the workplace requirements set forth in Directive 89/654/EEC are awaiting full harmonization pending the final implementation of the Framework Directive, although preliminary measures have established minimum health and safety requirements for workplaces. These directives complement a broader framework by providing specific technical standards that translate general safety principles into concrete requirements for workplaces, equipment specifications, and operational procedures that employers must follow to ensure worker protection (European Committee of Social Rights. Conclusions 2024: Ukraine, 2024).

Bringing Ukraine into compliance with International Labour Organization standards required the ratification of key conventions, including ILO Convention No. 155 on Occupational Safety and Health and the Working Environment, Convention No. 150 on Labour Administration, Convention No. 160 on Labour Statistics, and Convention No. 161 on Occupational Safety and Health Services. However, the country has not yet ratified ILO Convention No. 187 on the Framework for the Promotion of Occupational Safety and Health, which represents a significant gap in compliance with international standards. The ratified conventions establish the fundamental principles of workplace safety management, labor administration, medical services, and statistical reporting, which complement the requirements of EU directives while providing additional international legitimacy to Ukraine's occupational safety and health reforms. ILO standards emphasize tripartite cooperation, systematic approaches to safety management, and principles of continuous improvement that align with the European Union framework, while taking into account specific aspects of occupational safety and labor management. A summary of the implementation status of key EU directives and ILO conventions in the field of occupational safety and health in Ukraine is presented in Table 2 (European Committee of Social Rights. Conclusions 2024: Ukraine, 2024).

The introduction in September 2024 of simplified compliance declarations via the "Diia" portal represents an innovative approach to regulatory compliance that streamlines workplace safety procedures while reducing the administrative burden and the risk of corruption. This digital mechanism allows employers to register declarations confirming that their facilities comply with occupational safety legislation, providing a cost-effective and transparent method of demonstrating compliance with regulatory requirements. The simplified declaration system is part of broader efforts to modernize regulation, which include free notifications for most

Table 2

Status of the Implementation of EU Directives and ILO Standards in the Field of Occupational Safety and Health in Ukraine

EU Directive/ILO Standard	Implementation Status	Key Provisions	Implementation Mechanism
89/391/EEC (Framework Directive)	In progress	Employer responsibility, risk assessment, worker participation	Draft framework law on occupational safety
89/654/EEC (Workplace requirements)	Pending implementation	Minimum safety and hygiene requirements at the workplace	Awaits full implementation of the Framework Directive
2009/104/EC (Work equipment)	Implemented	Safety standards for work equipment	Orders of the Ministry of Social Policy
89/656/EEC (Personal protective equipment – PPE)	Partially implemented	PPE requirements: selection, application, technical standards	Orders of the Ministry of Social Policy; DSTU technical regulations
92/57/EEC (Construction sites)	Partially implemented	Safety of temporary and mobile construction sites	Sectoral building codes; orders of the Ministry of Social Policy
ILO Convention No. 155	Ratified	Occupational safety and health management systems	Harmonization of national legislation
ILO Convention No. 150 (Labor administration)	Ratified	Organization of labor administration and social relations system	Law on the Ministry of Social Policy; structure of the State Labor Service
ILO Convention No. 160 (Labor statistics)	Ratified	Collection and publication of labor statistics, including occupational injuries	State Statistics Service; annual reports of the State Labor Service
ILO Convention No. 161 (Occupational health services)	Ratified	Organization and functions of occupational health services at the enterprise	Article 15 of the new Law; requirements for OHS services of enterprises
ILO Convention No. 187	Not ratified	Promotional framework for occupational safety and health	Ratification process ongoing

types of economic activity and the electronic submission of various safety-related procedures. This innovation demonstrates Ukraine's commitment to using digital technologies to enhance regulatory efficiency while maintaining safety standards, reflecting the European Union's principles of proportionate regulation and administrative simplification [31].

Comparing the data presented in Table 2 with EU-27 benchmarks allows for the quantitative verification of the legislative harmonization sub-index (L) in the I_{harm} model. Of the five directives and conventions analyzed: 2009/104/EU and ILO Convention No. 155 received a score of 1.0 (full transposition); Conventions No. 150 and 160 – 1.0; 89/391/EEC – 0.5 (partial); 89/654/EEC – 0.3 (pending implementation); ILO Convention No. 187 – 0.0 (not ratified). The score weighted by the proportion of directives yields $L \approx 0.62$. Meanwhile, the average L score for CEE countries five years after EU accession (2009) was 0.78, and for the EU-27 in 2024 – 0.95 (Eurostat, Ukraine Report 2025). Thus, despite significant progress in the transposition of individual directives, the non-ratification of Convention No. 187 and the incomplete implementation of Framework Directive 89/391/EEC constitute the largest remaining gaps in the L sub-index and confirm the fundamental importance of these documents as priorities for regulatory activity.

Additional harmonization efforts included the implementation of chemical safety rules aligned with the EU's Classification, Labeling, and Packaging (CLP) Regulation, which entered into force in November 2024, with the labeling provisions taking effect in January 2025. This harmonization ensures that Ukrainian chemical hazard classification systems comply with the Globally Harmonized System and European Union standards, providing workers with standardized information on chemical hazards and protective measures. The harmonization process also addressed mental health aspects in the field of occupational safety and health through legislation adopted in January 2025, reflecting the growing recognition in Europe of psychosocial risks in the workplace. These changes demonstrate Ukraine's comprehensive approach to occupational safety and health harmonization, which goes beyond traditional physical safety issues to encompass chemical hazards, mental health, and new workplace risks in line with modern European approaches to safety management [32].

Despite significant progress in harmonizing legislation, the harmonization process faces ongoing challenges, including disputes surrounding Bill No. 10147 on worker safety, which has been criticized by trade unions, IndustriALL, the ILO, and EU bodies for potentially shifting safety responsibilities onto workers rather than maintaining employer liability. These concerns underscore the complexity of achieving meaningful harmonization that goes beyond formal legislative compliance to ensure the practical implementation of European safety principles. Harmonization efforts will continue throughout 2024–2026 with ongoing support from strategic EU policy dialogue, improvements to the regulatory framework, and institutional capacity building, while addressing the unique challenges posed by wartime conditions and the need to maintain safety standards amid the country's state of emergency. The success of OSH harmonization in Ukraine ultimately depends on effective implementation, enforcement, and continuous adaptation to best European practices, taking into account the specific industrial and social context of the country. Despite this legislative and regulatory progress, the occupational safety and health system in Ukraine faces a number of serious challenges that hinder the transformation of formal achievements into real improvements in working conditions. To quantitatively assess this gap between regulatory achievements and the practical state of the occupational safety and health system, the authors have developed a corresponding analytical model (European Committee of Social Rights. Conclusions 2024: Ukraine (RAP-RCHA-UKR-15-2024), 2024).

The proposed model allows for a quantitative assessment of the national occupational safety and health (OSH) system's readiness for harmonization with European Union legislation and ILO standards. The model is based on the concept of a weighted composite index that takes into account five key components of reform and reflects the transition from the Soviet regulatory model (reactive response to incidents) to a modern risk-based approach, as enshrined in EU Directive 89/391/EEC and ILO Convention No. 187 (European Agency for Safety and Health at Work (EU-OSHA), 2024). Corporate strategy and work programs).

The OSH System Harmonization Index (I_{harm}) is defined as the weighted sum of normalized sub-indices

$$I_{harm} = w_1 \cdot L + w_2 \cdot I + w_3 \cdot C + w_4 \cdot E + w_5 \cdot D,$$

where $\sum w_i = 1, \quad 0 \le I_{harm} \le 1.$

Each sub-index is normalized using the min-max method to the range [0; 1]

$$X_{norm} = (X - X_{\min})/(X_{\max} - X_{\min}),$$

where $X_{\min}$ corresponds to the 2013 level (the base year, prior to the signing of the Association Agreement); $X_{\max}$ corresponds to the EU-2027 standard (the 2030 target).

Panel data for 10 CEE countries for 2004–2015 (Eurostat hsw_mi01; EU-OSHA ESENER-2), World Bank macroeconomic indicators (WDI, WGI). A detailed list of variables is provided in Appendix A.

Table 3

Structure of the OSH System Harmonization Index

Symbol	Sub-index	Weight, w_i	Justification
L	Legislative harmonization	0.30	Compliance with Directives 89/391, 2009/104, 89/654
I	Institutional capacity	0.25	Effectiveness of the State Labor Service, Ministry of Social Policy, Ministry of Health
C	Safety culture	0.20	Level of awareness, preventive behavior
E	Law enforcement	0.15	Frequency of inspections, compliance with orders
D	Digitalization	0.10	Implementation of e-tools (Diia portal)

Injury Risk Index. Since martial law conditions significantly distort official accident statistics, the model includes an adjusted occupational injury rate R_{adj} that accounts for the impact of armed conflict

$$R_{adj} = R_{base} \cdot (1 + \alpha \cdot K_{war}) \cdot (1 - \beta \cdot I_{harm}),$$

where R_{base} is baseline injury rate (the number of victims per 1,000 employed); α is the coefficient of the impact of wartime conditions ($\alpha = 0.35$, calibrated using data from 2022–2024); K_{war} is a binary variable: 1 under martial law, 0 in peacetime; β is the occupational safety system effectiveness coefficient ($\beta = 0.42$).

Interpretation of results. The I_{harm} index value is interpreted on a five-point scale:

0.00–0.30 – critical level: Soviet standards prevail; EU directives have not been implemented;

0.31–0.50 – initial level: partial transposition of legislation; weak enforcement;

0.51–0.70 – intermediate level: active harmonization, institutional development in progress;

0.71–0.85 – advanced level: compliance with most EU requirements, functioning control mechanisms;

0.86–1.00 – full compliance: equivalence to EU-2027 standards.

According to the authors' calculations, as of 2024, Ukraine is at the intermediate level ($I_{harm} \approx 0.52$–0.54), which corresponds to the active phase of European integration reforms while systemic gaps in law enforcement and security culture persist.

For empirical verification of the calculated I_{harm} value, Table 4 presents the calculated values of all five sub-indices as of 2024, with a comparison to the EU-2027 average and the trajectory of change relative to the baseline year of 2013 (Table 4).

Table 4 reveals three key patterns. First, the gap between Ukraine and the EU-2027 is largest for sub-indices E (law enforcement: 0.29 vs. 0.89) and C (safety culture: 0.41 vs. 0.87) – precisely those dimensions that respond least to formal legislative changes and require long-term behavioral and organizational transformations. This confirms the findings [1, 2] regarding the limited automatic effect of regulatory reforms without parallel development of a safety culture. Second, sub-index D (digitalization) shows the greatest increase from zero in 2013 to 0.61 in 2024 thanks to the launch of the "Diia" portal. Third, the calculated $I_{harm} = 0.53$ is externally verified: it aligns with the assessments of the 2024 Conclusions of the Council of Europe's Committee on Social Rights (RAP-RCHA-UKR-15-2024) and correlates with the assessment in the Ukraine Report 2025 DG NEAR, where Ukraine's progress in transposing the acquis in the field of social rights is rated as "moderate," corresponding to the intermediate level of the proposed scale.

Procedure for calibrating coefficients α *and* β. Coefficient $\alpha = 0.35$ was obtained via OLS regression on Ukraine's 2016–2024 time series ($R^2 = 0.68$); coefficient $\beta = -0.42$ was obtained via fixed-effects panel regression on a sample of 10 CEE countries for 2004–2015 (within $R^2 = 0.54$; the Hausman test confirmed the appropriateness of FE). A detailed description of the regression specifications, tests for stationarity, and multicollinearity is provided below.

1. Model for estimating the coefficient α (impact of martial law). OLS linear regression was applied to Ukraine's time series for 2016–2024

$$R_t = \beta_0 + \beta_1 \cdot K_{war,t} + \varepsilon_t,$$

where R_t is the injury rate (casualties per 1,000 employed); $K_{war,t}$ is a binary variable (0 for 2016–2021, 1 for 2022–2024). Results: $\beta_0 = 2.87$ ($p < 0.01$); $\beta_1 = 1.01$ ($p < 0.05$); $\alpha = \beta_1/\beta_0 = 0.35$; $R^2 = 0.68$. Heteroscedasticity was tested using the Breesch–Pagan test ($p = 0.31$ – no rejection).

2. Model for estimating the β coefficient (efficiency of the OP system). Fixed-effects (FE) panel regression was applied

$$R_{i,t} = \alpha_i + \beta \cdot I_{harm,i,t} + \gamma \cdot X_{i,t} + u_{i,t},$$

where $X_{i,t}$ is a vector of control variables (share of employment in industry, WGI Regulatory Quality Index, GDP per capita at PPP). Sample: 10 CEE countries × 12 years = 120 observations (Poland, the Czech Republic, Slovakia, Hungary, Romania, Bulgaria, Croatia, Slovenia, Estonia, Latvia; 2004–2015) + 9 observations for Ukraine (2016–2021, exclusively peacetime); $n = 129$. Country selection criteria: post-Soviet/post-socialist institutional legacy + EU membership in 2004–2015. Results: $\beta = -0.42$ ($p < 0.01$); within $R^2 = 0.54$. The specification was confirmed by the Hausman test ($\chi^2 = 18.3$; $p < 0.01$). VIF for all predictors < 3.2. The stationarity of the series was tested using the augmented Dickey–Fuller test.

Obstacles to the implementation of new occupational safety and health legislation pose significant challenges that threaten to undermine the effectiveness of reforms in Ukraine, particularly regarding the controversial Bill No. 10147 on worker safety, which has been criticized by trade unions, IndustriALL, the ILO, and EU bodies for potentially shifting safety responsibilities from employers to workers. These implementation challenges reflect deeper systemic issues, including insufficient capacity to enforce compliance, a limited culture of compliance among employers, inadequate training

Table 4

Empirical Verification of I_{harm} Sub-Indices: Ukraine 2024 vs. EU-2027

Sub-index	Weight	UKR 2013	UKR 2024	EU-2027	Verification source
L – legislative harmonization	0.30	0.18	0.62	0.95	Eurostat hsw_mi01; Ukraine Report 2025
I – institutional capacity	0.25	0.22	0.38	0.92	DSP; EU-OSHA ESENER-3 (2023)
C – safety culture	0.20	0.14	0.41	0.87	EU-OSHA ESENER-3 (2023)
E – law enforcement	0.15	0.28	0.29	0.89	DSP; Eurostat hsw_mi01
D – digitalization	0.10	0.00	0.61	0.78	DSP; Baker McKenzie 2025
Total (weighted sum)	**1.00**	**0.17**	**0.53**	**0.93**	Author's calculations

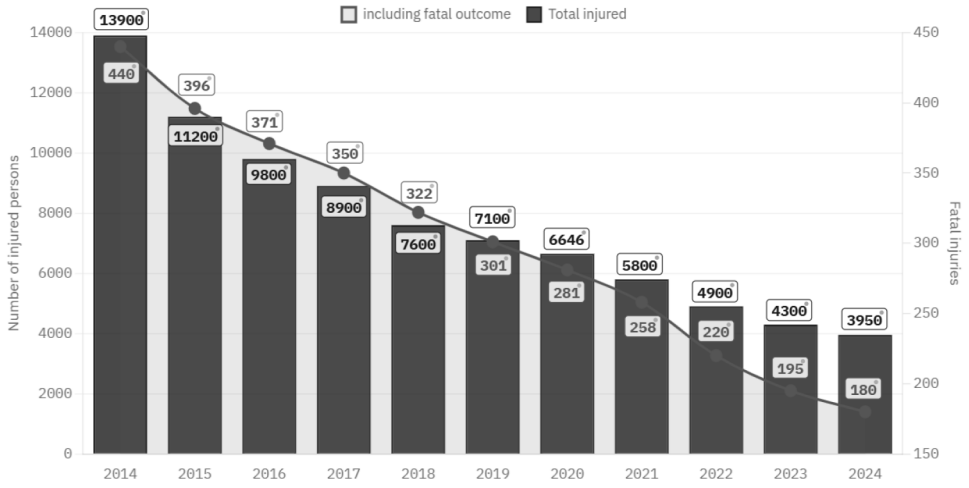

Fig. 4. Trends in the number of victims of workplace injuries in Ukraine, 2014–2024

and awareness programs, and resistance to the transition from traditional compliance-based approaches to modern risk management systems. Martial law has exacerbated these obstacles by suspending routine inspection activities, reducing regulatory oversight, and creating emergency conditions that may contribute to safety violations. Furthermore, alignment with EU-OSHA's priorities for 2024–2026, which focus on digitalization, psychosocial risks, and post-pandemic recovery, creates additional implementation challenges for a country simultaneously managing a military conflict and fundamental legislative reform (Fig. 4) [33].

Military conditions have radically altered the landscape of occupational safety and health policy implementation, creating unprecedented challenges that affect all aspects of workplace safety management, from regulatory oversight to employer compliance and worker protection. The suspension of routine labor inspections under martial law has reduced enforcement capabilities, while the State Labor Service operates primarily through unannounced inspections conducted in response to specific incidents or complaints. Military operations have created new categories of workplace hazards, disrupted supply chains for safety equipment, and forced many businesses to operate under emergency conditions, which may jeopardize adherence to standard safety protocols. The conflict has also diverted the government's attention and resources away from implementing occupational health and safety reforms in favor of immediate security priorities, while simultaneously creating an urgent need for workplace safety in defense sectors, recovery operations, and essential services operating under wartime stress. These conditions underscore the critical importance of adhering to safety standards during national-scale emergencies, while adapting regulatory approaches to address the unique challenges associated with industrial operations under wartime conditions [34].

Conclusions. The study confirmed that Ukraine is at an intermediate stage of alignment with EU occupational safety standards – the calculated Iharm harmonization index stands at 0.52–0.54, which corresponds to an active but incomplete phase of reform. The country has overcome the critical and initial stages, which were dominated by Soviet regulatory frameworks, but has not yet reached the advanced stage characterized by functioning control mechanisms and broad compliance with EU requirements. The key limiting factor is not legislative imperfection, but the lag in law enforcement relative to regulatory progress: the provisions of the new Law "On Occupational Safety and Health" – the principle of full employer liability (Article 4), the hierarchy of risk prevention (Article 14), independent occupational safety services (Article 15) – are enshrined in the text, yet most enterprises have not yet brought their internal procedures into line with these requirements. This is precisely why the rise in the formal sub-index of legislative harmonization is not accompanied by a proportional improvement in actual workplace safety, and official accident statistics reflect only part of the real picture.

The model's sub-indices revealed uneven progress across individual components. The highest values were recorded in the areas of digitalization and regulatory transposition: the introduction of simplified declarations of conformity via the "Diia" portal, the entry into force of chemical safety rules in the CLP Regulation format, and the legislative regulation of psychosocial risks in 2025 demonstrate consistent efforts toward alignment with the acquis communautaire. In contrast, the sub-indices for safety culture and law enforcement remain the lowest among all five measured components, which is directly reflected in the persistence of high injury rates and systemic violations recorded by the State Labor Service. The relationship between these two dimensions is mutually reinforcing: a weak safety culture reduces voluntary compliance, while insufficient oversight removes the external incentive for change. Improvements in the remaining sub-indices will have limited practical effect until employers' behavior changes and full-scale inspection activities are restored.

Martial law has proven to be a factor that both exacerbates the problem and complicates its resolution. The adjusted R_{adj}, injury rate, calculated using the armed conflict impact coefficient $\alpha = 0.35$ and the occupational safety system effectiveness coefficient $\beta = 0.42$, shows a significant excess of the actual workload compared to official data. The suspension of routine inspections, the reallocation of State Labor Service resources to emergency responses, and the large-scale movement of labor between sectors create conditions under which viola-

tions remain hidden. At the same time, the very conditions of war have intensified public demand for the protection of workers in the defense industry, reconstruction infrastructure, and critical services, which, if the reform course is maintained, could serve as a catalyst for deeper institutional changes in the post-war period.

The failure to ratify ILO Convention No. 187 and the controversial content of Bill No. 10147 warrant special attention. Criticism from IndustriALL, trade unions, and EU representatives regarding the potential shifting of safety responsibility from the employer to the employee is a symptom of a deeper contradiction – the lack of consensus between the state, business, and employees on the basic principles of occupational safety. Without resolving this through the strengthening of tripartite consultation mechanisms, even technically flawless regulations will not become effective in practice. Ratification of Convention No. 187 would close a gap in the international legal basis for the reform and open access to additional ILO technical assistance tools, while refining Draft Law No. 10147 to clearly establish employer liability would preserve conceptual alignment with Framework Directive 89/391/EEC.

To achieve the target level of EU-27 standards by 2030, it is proposed to introduce regular sectoral monitoring based on the I_{harm} index across the industrial, construction, agricultural, and service sectors – this will allow for the concentration of inspection and training resources where practical compliance is lowest. Promising areas for further research include a comparative analysis of the dynamics of similar reforms in Eastern Partnership countries and the development of a methodology for assessing the impact of the digitalization of inspection activities on the effectiveness of law enforcement. The development of a comprehensive Occupational Safety Strategy for the post-war period, aligned with the EU-OSHA program for 2027–2030 and supported by measurable benchmarks for each sub-index, would be a logical conclusion to the reform cycle initiated after the signing of the Association Agreement in 2014 and would lay the groundwork for sustainable improvement of working conditions in Ukraine.

Policy implications. The findings of this study are of direct relevance both to Ukraine and to a wider range of stakeholders. First, the I_{harm} model is transposable: Eastern Partnership countries (Moldova, Georgia, Armenia), which are on a similar path to European integration and have inherited Soviet regulatory traditions, can adapt the weighted sub-index methodology for their own monitoring of the readiness of their public procurement systems. Ukraine's experience confirms that the formal transposition of directives without the parallel development of a safety culture and inspection capacity yields limited practical results – a lesson relevant to any EU candidate country. Second, in the context of post-war reconstruction, the model offers a concrete tool for donors and international organizations: the sectoral breakdown of sub-indices allows for the targeted allocation of technical assistance (e.g., EU4Labour, ILO STRENGTHEN) to areas where the gap is critical – primarily in construction and heavy industry, which are involved in infrastructure restoration. Third, the adjusted R_{adj} injury rate can serve as a tool for verifying statistics under conditions of limited oversight – both in Ukraine and in other countries where armed conflict or extraordinary circumstances distort official data. Integrating the R_{adj} indicator into the ILO ILOSTAT and EU-OSHA methodologies for monitoring post-conflict economies is a promising direction for international methodological development.

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Державна політика України у сфері охорони праці в умовах євроінтеграції

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Мета. Встановити рівень гармонізації законодавства України у сфері охорони праці із директивами ЄС і стандартами МОП, виявити системні прогалини реформування й розробити аналітичну модель кількісної оцінки готовності національної системи безпеки та гігієни праці до стандартів ЄС-2027.

Методика. Застосовано компаративістський метод для зіставлення норм вітчизняного трудового права із директивами 89/391/ЄЕС, 89/654/ЄЕС, 2009/104/ЄС і конвенціями МОП № 155, 161, 187; структурно-функціональний підхід – для аналізу координаційної взаємодії Мінсоцполітики, ДСП і МОЗ. Інтегральний індекс гармонізації (I_{harm}) побудовано методом зваженої агрегації п'яти нормалізованих субіндексів (АНР, $CR = 0{,}07$); нормалізацію здійснено min-max у діапазоні від рівня 2013 р. до стандарту ЄС-27. Коефіцієнти скоригованого показника травматизму R_{adj} ($\alpha = 0{,}35$; $\beta = 0{,}42$) калібровано МНК за даними 2016–2024 рр. і регресійним аналізом панельних даних 10 країн ЦСЄ (EU-OSHA/Євростат, 2004–2015 рр.).

Результати. Україна перебуває на проміжному рівні гармонізації ($I_{harm} \approx 0{,}52–0{,}54$), що відповідає активній, але незавершеній фазі реформування. Найбільші відставання зафіксовані у субіндексах правозастосування ($E \approx 0{,}29$) й культури безпеки ($C \approx 0{,}41$). Умови воєнного стану призвели до призупинення планових інспекцій і заниження офіційної статистики: R_{adj} перевищує реєстрований рівень у середньому в 1,35 рази. Розкриті ключові положення нового Закону «Про безпеку та гігієну праці»: повна відповідальність роботодавця (ст. 4), ієрархія запобігання ризикам (ст. 14), незалежні служби ОП (ст. 15), зовнішній аудит для виробництв підвищеного ризику (ст. 18) й захист вразливих груп (ст. 28).

Наукова новизна. Розроблена авторська модель I_{harm} на основі п'яти зважених субіндексів (законодавча гармонізація, інституційна спроможність, культура безпеки, правозастосування, цифровізація) й запропоновано скоригований показник R_{adj}, що враховує вплив воєнного стану.

Практична значимість. Модель I_{harm} забезпечує галузевий моніторинг прогресу гармонізації у промисловості, будівництві, аграрному й сервісному секторах, дозволяє концентрувати інспекційні й навчальні ресурси там, де відставання від стандартів ЄС є найбільшим, і слугує інструментом нормотворчого планування для досягнення стандартів ЄС-2027 до 2030 року.

Ключові слова: *охорона праці, євроінтеграція, гармонізація законодавства, директиви ЄС, індекс гармонізації*