

## IMPROVEMENT OF OCCUPATIONAL SAFETY AND HEALTH MANAGEMENT SYSTEM IN UKRAINE IN VIEW OF RELEVANT DECLARED INITIATIVES OF EUROPEAN UNION

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**Abstract.** The current problem of implementing European approaches to safety and health at work in Ukraine must take into account certain differences in the national occupational safety and health (OSH) legislation and the realities of its compliance at various enterprises. The purpose of this research is to characterize the main strategic directions of OSH activities in Ukraine on the basis of a comparative analysis of statistical indicators of occupational injuries in the EU countries and in Ukraine. A system-wide approach was applied, based on the methodology of statistical analysis of indicators of industrial injuries. This made it possible to substantiate the investigated structure and relationships of the OSH system. The analysis of the coefficients calculated as the ratio of the total number of injured workers to the number of deaths at work showed that the trend of increasing this coefficient during the previous ten years is characteristic of EU countries, in contrast to Ukraine, where this coefficient decreased by 40%. It is shown that for the introduction of European approaches to OSH strategy in Ukraine, it is necessary to take into account the existing differences in approaches to assessing the statistics of industrial injuries and occupational morbidity. Based on the statistical analysis of the data of the State Labour Service of Ukraine, three main causes of industrial injuries were identified, the total share of which reaches 80% of the total number of causes used in the state statistics of industrial injuries, which corresponds to the Pareto principle. As part of the OSH system in agricultural enterprises of Ukraine, potential occupational risks during the performance of mechanized works were determined according to the method of expert assessments, analyzed and systematized according to their categories - high, medium, low.

**Keywords:** occupational risk, occupational safety, occupational safety management system, safety and health at work.

### Introduction

In the European Union (EU), legislative activity is currently underway to improve the state of occupational health and safety (OSH), in particular, the EU Framework Strategy for Safety and Health at Work for 2021-2027 "Safety and Health at Work in a Changing World of Work" has been implemented [1]. The emphasis in the EU Framework Strategy is focused on the issues of industrial digitalization (computerization, robotization, automation) and environmentalization, taking into account the latest demographic and economic challenges, as well as changes that force a somewhat different view of the industrial (working) environment [2; 3].

It is important that the Framework Strategy is aimed at rallying around the common OSH priorities of EU member states and their institutions, as well as social partners in these states. Such interaction is not enough in the managerial solution of occupational safety and health issues in Ukraine at the level of the state, industry and enterprise. In particular, this applies to the agricultural sector of the economy [4].

The purpose of the research is to characterize the main strategic directions of occupational safety and health activities in Ukraine based on the analysis of statistical indicators of occupational injuries in the EU countries and in Ukraine in accordance with the declared initiatives of the EU Framework Strategy on OSH.

The tasks of this research are as follows: make an analysis of the main differences of OSH legislation in the EU and in Ukraine; identify the most significant causes of industrial injuries in Ukraine; to develop a scheme for the functioning of the OSH system in Ukraine at the state and enterprise levels.

### Materials and methods

In this research a system-wide approach is used based on the methodology of analyzing statistical indicators of industrial injuries, which allows to substantiate the structure and relationships of the main strategic directions of occupational safety and health in Ukraine.

The basis of the research carried out in this work was a comparative analysis of industrial injury statistics in the EU and Ukraine. It was taken into account that the statistical structure of reporting on

industrial accidents and occupational diseases in Ukraine is somewhat different. That is, there are significant differences in the structure of occupational morbidity in the EU and in Ukraine. It should also be taken into account that in the scientific literature and statistical bulletins on industrial injuries of Ukraine there are no data on statistical mortality due to occupational diseases [5]. It should be noted that the statistical data indicated in this work are limited to 2020, that is, to the period of the spread of the COVID-19 epidemic in the EU and Ukraine,

The changes during 2011-2018 in the coefficient  $K_{ratio}$ , which characterizes the ratio of the total number of injured workers to the number of deaths at work ( $K_{ratio} = N_{injury}/N_{total}$ ), were analyzed. In this formula  $N_{total}$  – the number of workers who died during the year;  $N_{injury}$  – the number of injured workers (without taking into account the number of dead).

## Results and discussion

As a result of the comparison, it was found that the coefficients  $K_{ratio}$ , which were calculated based on the statistical data of the State Labour Service of Ukraine, are ten times smaller than the corresponding coefficients for European countries, except for Romania.

Therefore, Fig. 1 is presented in two parts: Fig. 1, a presents charts that illustrate trends in the coefficient  $K_{ratio}$  separately for the EU and other countries, as well as for Romania and Ukraine (Fig. 1, b). Trend charts are represented by dashed lines.

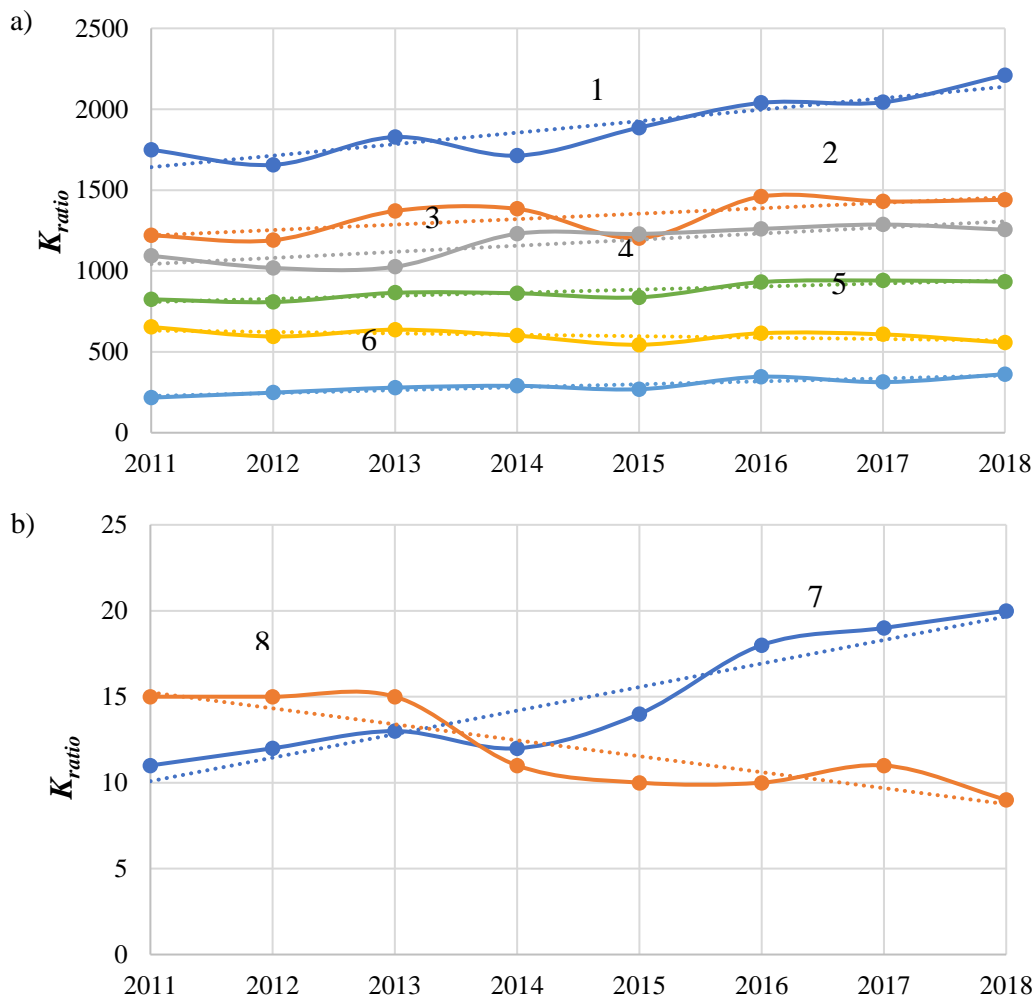


Fig. 1. Dynamics of changes in the ratio of the total number of injured workers to the number of deaths at work by year: a – for the EU and other countries; b – for Romania and Ukraine (1 – Germany; 2 – Spain; 3 – France; 4 – Italy; 5 – Poland; 6 – EU (27 countries); 7 – Romania; 8 – Ukraine)

For all countries whose statistical data on industrial injuries were used in the calculations, during the period 2011-2018, the trend of increasing the coefficient  $K_{ratio}$  is characteristic, in contrast to Ukraine, where the coefficients  $K_{ratio}$  decreased by 40%. Therefore, the strategy of implementing European approaches to OSH in Ukraine should take into account the identified trends and direct the main efforts to reduce the severity of injuries.

The following main areas of improvement of occupational health and safety activities in Ukraine in accordance with the declared initiatives of the EU Framework Strategy for Safety and Health at Work can be proposed for discussion: a) development of guidelines for occupational risk assessment (for various types of enterprises) and for ensuring the mental health of employees (overcoming professional stress); b) review the current limit values of exposure to certain hazardous substances for the health of workers (not only asbestos, but also new types of pesticides); c) modernize the legislative framework on OSH by linking it to digitalization (making it easier for users to work with documents); d) development measures to reduce psychosocial and ergonomic risks associated with remote work and others.

Industrial injury statistics can be used to identify priority areas of OSH work. In this work, the significance of the main causes in the statistics of industrial injuries in Ukraine, which are grouped into three groups, was considered, such as organizational, technical and psychophysiological (Table 1).

Table 1

**Dynamics of industrial injuries with fatal consequences  
in Ukraine by groups of causes of industrial injuries**

| Groups of reasons                     | Main causes of injury   | Serial number of the cause | Years                                       |      |      |      |      |
|---------------------------------------|---|----------------------------|---|------|------|------|------|
|                                       |   |                            | 2017  | 2018 | 2019 | 2020 | 2021 |
|                                       |   |                            | Number of workers who died due to accidents |      |      |      |      |
| Technical                             | Means of production, equipment, vehicles, buildings, etc. (dangers during direct performance of work)                                   | 3                          | 37  | 24   | 26   | 19   | 17   |
|                                       | Violations in project (design) documentation, technological process (at the preparatory stage) regarding the safety of work performance | 6                          | 8   | 15   | 13   | 11   | 10   |
|                                       | Non-observance (failure to ensure) of safety standards of the production environment  | 8                          | 7   | 19   | 18   | 8    | 23   |
| Organizational                        | Unsatisfactory organization of preparation for safe work performance  | 1                          | 166   | 188  | 204  | 116  | 108  |
|                                       | Violation of established requirements during the performance of works   | 7                          | 7   | 11   | 11   | 135  | 136  |
|                                       | Violations regarding the use of personal protective equipment   | 2                          | 106   | 104  | 95   | 27   | 41   |
| Psycho-physiological                  | Illegal factors   | 9                          | 6   | 8    | 9    | 19   | 16   |
|                                       | Personal physical factors   | 5                          | 9   | 16   | 21   | 14   | 7    |
|                                       | External factors of influence   | 4                          | 20  | 24   | 25   | 16   | 21   |
| Man-made, natural, ecological, social | Technical, technological emergencies  |                            | 0   | 0    | 0    | 0    | 0    |
|                                       | Natural phenomena   | 11                         | 0   | 0    | 0    | 1    | 3    |
|                                       | Social phenomena  | 10                         | 0   | 0    | 0    | 12   | 4    |
| Total                                 |   |                            | 366   | 409  | 422  | 378  | 386  |

Fig. 2 presents diagrams characterizing the percentage significance of the causes of industrial injuries, marked by the corresponding numbers in Table 1, for individual years. The diagrams are built according to the Pareto principle, and they confirm the validity of this principle for the statistics of industrial injuries in Ukraine – 80% of accidents cause 20% of the causes of industrial injuries. Since changes in the significance of the causes of injury from year to year are insignificant, the diagrams in Fig. 2 practically overlap. Therefore, in Fig. 2 chart numbers for individual years are not marked in order not to complicate the perception of the chart image.

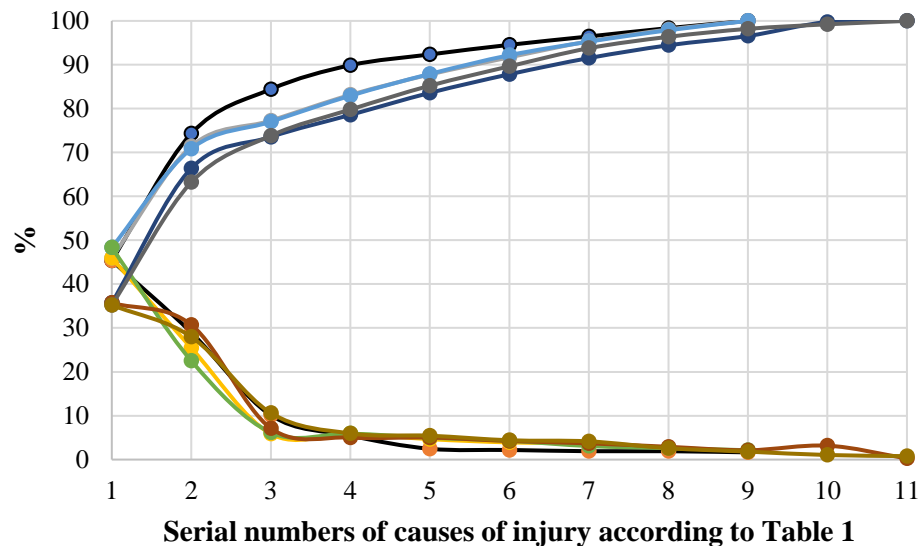


Fig. 2. Diagrams of significance of the causes of fatal industrial injuries in Ukraine for the period 2017-2021

From Fig. 2, it can be seen that the 80% – 20% rule (Pareto principle) includes the values of the three causes of industrial injuries, indicated in Table 2, – organizational (numbers 1 and 2) and technical (number 3). That is, according to the statistical data on the causes of industrial injuries in Ukraine, three causes are decisive: unsatisfactory organization of work, violation of the rules for the use of personal protective equipment and unsatisfactory condition of production facilities, equipment, vehicles and buildings. It is for these causes that OSH systems at the state, industry, and enterprise levels should be aimed at reducing the risk of injury. Of course, without neglecting the occupational risks assessed in the workplaces as indicated in the work [6].

In the Framework Strategy of the EU, one of the important areas is the analysis of information on occupational health and safety at enterprises that are considered small and medium-sized, because they often violate regulatory occupational health and safety requirements. In particular, in Ukraine such a problem is relevant for the agricultural industry with a large number of farms and small enterprises [7].

The introduction of modern means of automation and mechanization of technological processes (for example, at workplaces contaminated with chemical substances, under adverse weather conditions), as well as increasing the share of remote work will allow to reduce professional risks at the workplaces of agricultural production. This is extremely relevant, for example, in the case of performing works in places where manure is stored, in areas (zones) where pesticides are used. However, it is necessary to take into account the risks of using new, imperfect machines without effective technical means of protection [8].

The OSH system at Ukrainian enterprises, as well as in EU countries, should be based on the concept of occupational risk assessment [9]. Fig. 3 shows how professional risks can be systematized for an agricultural enterprise according to their levels (high, medium, low). The number of categories within the framework of the operation of the enterprise's OSH system can be increased depending on the experts' mastery of the methodology of occupational risk assessment [10; 11].

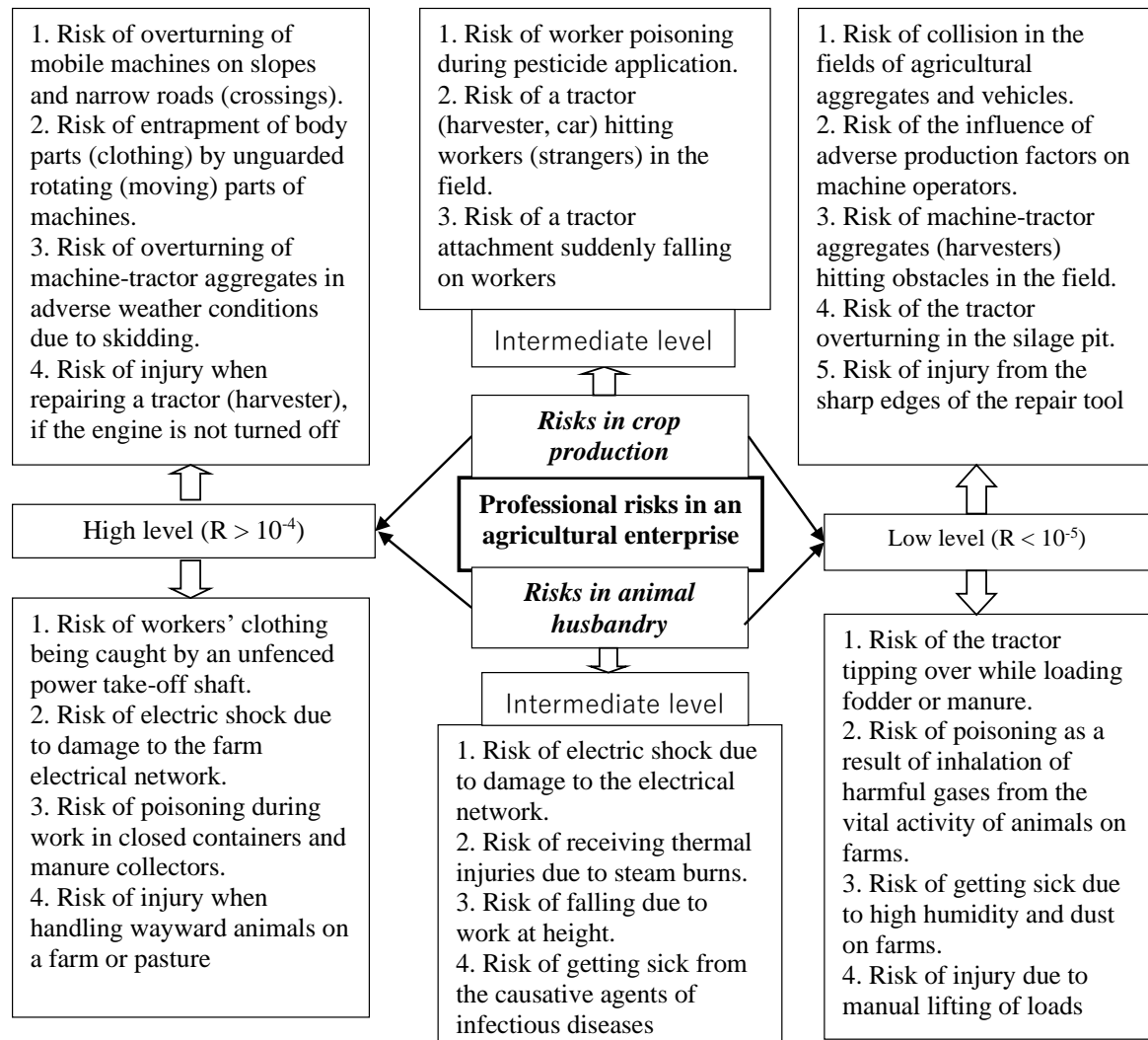


Fig. 3. Systematization of professional risks at agricultural enterprises by categories

## Conclusions

1. The main differences between occupational safety and health legislation in the EU and Ukraine were analyzed, which made it possible to single out the strategic directions of occupational health and safety activities in Ukraine in accordance with the declared initiatives of the EU Framework Strategy on OSH.
2. The trends of the change over the previous years of the coefficient characterizing the ratio of the total number of injured workers to the number of deaths at work were studied. It was defined that this coefficient, which in Ukraine is ten times smaller than the corresponding coefficients for most European countries, shows a steady trend of growth, which indicates an increase in the volume of "hidden" general industrial injuries in Ukraine.
3. It has been established that the diagrams characterizing the percentage significance of the causes of industrial injuries for individual years for the statistics of industrial injuries in Ukraine correspond to the Pareto principle – 20% of the causes of industrial injuries lead to 80% of accidents. It is for these causes that OSH systems at the state, industry, and enterprise levels should be aimed at reducing the risk of injury.
4. The OSH system functioning scheme has been developed at two levels: state and enterprise. The basis of the occupational health and safety system at the enterprise level should be the strict observance of the rights of employees for safe and healthy working conditions, as well as the fulfillment by employers and employees the established occupational health and safety obligations. It is shown that the OSH system should be based on the concept of occupational risk assessment at workplaces.

### Author contributions

Conceptualization, O.V.; methodology, O.V. and O.H.; validation, V.K. and M.M.; formal analysis, O.V. and O.H.; investigation, O.V., O.H., V.K. and M.M.; data curation, O.H.; writing – original draft preparation, O.V.; writing – review and editing, O.V. and V.K.; visualization, O.V., M.M.; project administration, V.K.; funding acquisition, O.H. All authors have read and agreed to the published version of the manuscript.

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