

## ІНЖЕНЕРІЯ СЕРЕДОВИЩА ТА БЕЗПЕКА ЖИТТЄДІЯЛЬНОСТІ

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### **PROMISING DIRECTIONS FOR IMPROVING REGULATORY LEGAL FRAMEWORK OF UKRAINE ON LABOUR PROTECTION FOR ENTERPRISES PRODUCING FOOD AND BEVERAGES**

У статті проаспектовано причини виникнення нещасних випадків на виробництві та встановлено, що 63 % з них припадає на організаційні, а саме на невиконання вимог нормативно-правових актів з охорони праці. Проведено аналіз міжгалузевих і галузевих нормативно-правових актів з охорони праці для підприємств з виробництва харчових продуктів та напоїв. На основі проведеного аналізу, виявлено ряд недоліків в їх структурі, змісті та інформаційному наповненні. Запропоновано перспективні напрямки удосконалення нормативно-правової бази України з охорони праці стосовно уніфікації структури нормативно-правових актів, розробки необхідних методів та науково-обґрунтованих критеріїв кількісної оцінки небезпечних і шкідливих виробничих факторів, створення єдиної автоматизованої системи аналізу і оновлення, а також розробки та впровадження документів щодо сертифікації технічних систем на відповідність вимогам з охорони праці.

**Ключові слова:** охорона праці, виробничий травматизм, професійні захворювання, нормативно-правова база, удосконалення, технічні системи.

В статье проаспектированы причины возникновения несчастных случаев на производстве и установлено, что 63 % из них приходится на организационные, а именно на невыполнение требований нормативно-правовых актов по охране труда. Проведен анализ межотраслевых и отраслевых нормативно-правовых актов по охране труда для предприятий по производству пищевых продуктов и напитков. На основе проведенного анализа, выявлен ряд недостатков в их структуре, содержании и информационном наполнении. Предложены перспективные направления усовершенствования нормативно-правовой базы Украины по охране труда, которые касаются унификации структуры нормативно-правовых актов, разработки необходимых методов и научно обоснованных критериев количественной оценки опасных и вредных производственных факторов, создания единой автоматизированной системы анализа и обновления, а также разработки и внедрения документов для сертификации технических систем на соответствие требованиям по охране труда.

**Ключевые слова:** охрана труда, производственный травматизм, профессиональные заболевания, нормативно-правовая база, усовершенствование, технические системы.

The article gives the cause of accidents at work and found out that 63 % of them are organizational, namely in failure the demands of legal acts of labor protection. The analysis of inter-industry and industry regulations on labor protection for enterprises producing food and beverages was conducted. On the basis of the analysis a number of shortcomings were revealed in their structure, content and information filled. Perspective directions of improvement of the legal framework of Ukraine of labor protection concerning safety unify the structure of legal acts were suggested, the development of necessary methods and the necessary science-based criteria for quantitative assessment of hazardous and harmful factors, creating a single automated system of analysis and updates as well as design and implementation documents on certification of technical systems and compliance with health and safety.

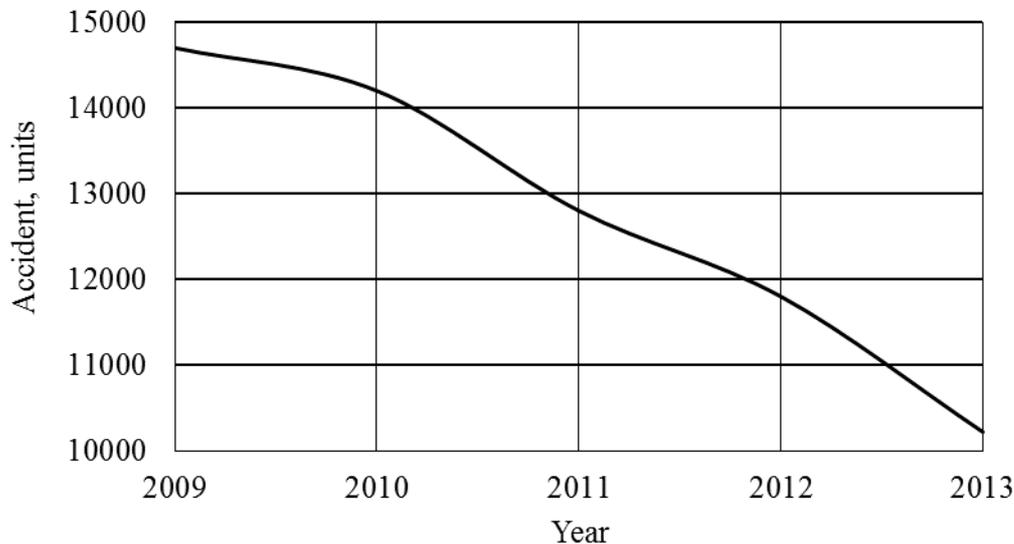
**Keywords:** labor, occupational injuries, occupational diseases, legal framework, improvements, technical systems.

**Introduction.** Legislative and regulatory legal framework of any country in the world is a fundamental basis for construction and regulation relations in different spheres of society's life. A special place in the legislation occupy normative legal documents aimed at ensuring protection of person's health and life during his/her production activities, in particular inter-industry and industry-specific normative legal documents on labour protection.

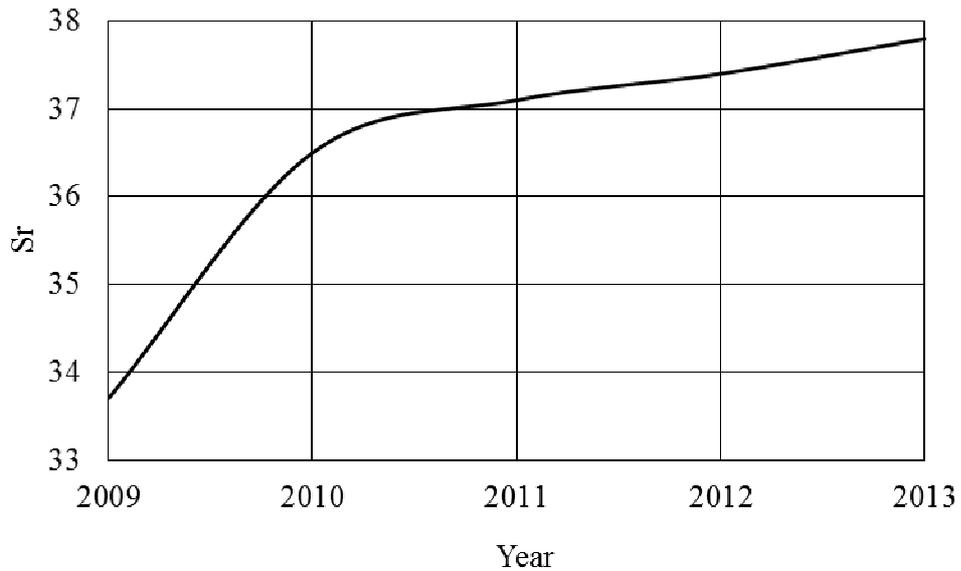
Depending on how clearly, competently and professionally algorithms of modern technological systems reflected in these documents, depends not only provision of healthy and comfortable occupational conditions at the separate enterprise (shop area), but also main development indicators of the country (economic, social, etc).

Modern legal framework of Ukraine on labour protection contains 2 laws, Code and over 1,000 subordinate regulatory legal acts (hereinafter referred to as regulatory legal acts) and is aimed both at exercising the main constitutional human right – right to appropriate, safe and healthy occupational conditions (article. 43, Constitution of Ukraine) [6], and regulation of relations in the State policy implementation sector regarding legal, socioeconomic, medical and preventive measures and remedies aimed at maintaining person's health and working capacity in the course of his/her activities. However, despite almost 100 % provision of national economy branches with all necessary regulatory legal acts on labour protection, certain performance indicators of occupational safety and health of workers (severity rate, level of occupational diseases, etc.) consistently show a negative trend.

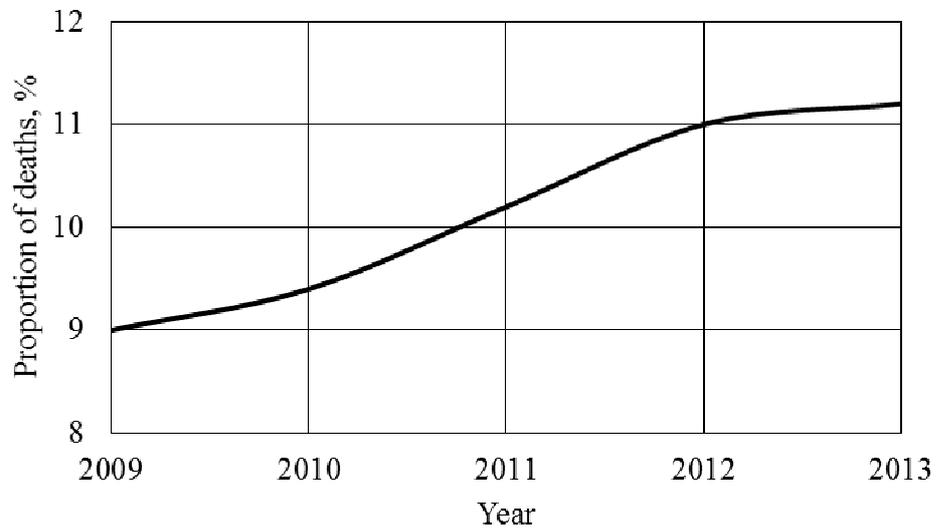
**Problem statement.** In spite of continuous positive dynamics of the accident frequency rate decreasing in Ukraine (fig.1), the severity rate (Sr) and the proportion of deaths in total volume of accident victims is constantly growing (fig. 2, 3) [2, 9]. More than 10 thousand accidents related to the production (every tenth accident is fatal) are recorded in our State year over year.



**Fig. 1 – The dynamics of industrial accidents in Ukraine in 2009 – 2013**

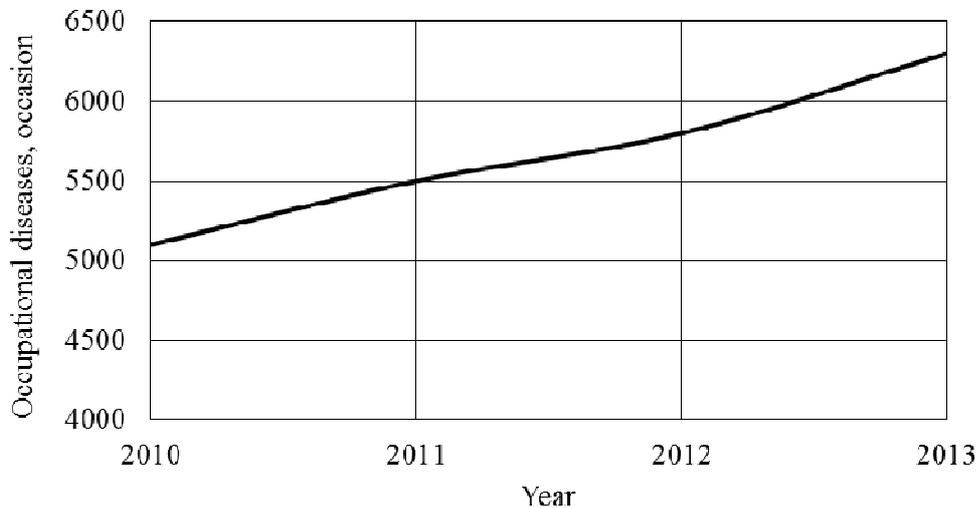


**Fig. 2 – The dynamics of severity rate changes in Ukraine in 2009 – 2013**



**Fig. 3 – The dynamics of changing proportion of deaths in total volume of accident victims in Ukraine in 2009 – 2013**

A similar situation is observed with the level of occupational diseases, which amount has increased in Ukraine by 20 % for the last 5 years (fig.4) [2].



**Fig.4 – The dynamics of increasing occupational diseases in Ukraine in 2010-2013**

It should be emphasized that in our country these figures exceed the relevant indicators of developed countries in 2 – 3 times [3, 4].

This situation has impact not only on social aspects of national development (primarily on preservation of human resources), but also on its economic indicators. In particular, average compensation to victims and their families for damages from industrial injuries and occupational diseases in our country exceeds 10 % of GDP [2]. For comparison, in developed countries, this indicator does not exceed 4 – 5 % [4].

In the structure of industrial injury causes and occupational diseases prevail organizational reasons that somehow related to failure to comply with (or lack of) relevant requirements of the regulatory legal acts on labour protection.

**Literature review.** The researches of such scientists as Podobyed I.M., Vagivskiy V.M., Olegiy N.Ye., Dengin O.P., Yesypenko A.S., Tairova T.M. [1], Volkov V. Gryshchuk M.V. [5], Taran O.V. [8] were dedicated to problems of improving regulatory legal framework of Ukraine on labour protection. However, despite the fact that food industry is one of the leading industries of Ukrainian economy, involving about 15 % of working population, improvement and revision of most relevant regulatory legal acts on labour protection was not held since the USSR period.

**The purpose of this work includes analysis of regulatory legal framework of Ukraine on labour protection for enterprises producing food and beverages and its improvement as the object of research.**

Objectives laid down in this work will be achieved in the process of solving the following **tasks:**

- consideration causes of industrial accidents;
- analysis of the regulatory legal framework of Ukraine on labour protection for enterprises producing food and beverages;
- promising directions for improving regulatory legal framework of Ukraine on labour protection.

According to average data of the social insurance fund, for the period from 2010 to 2014, industrial accidents occurred for the following reasons [2]:

Organizational:

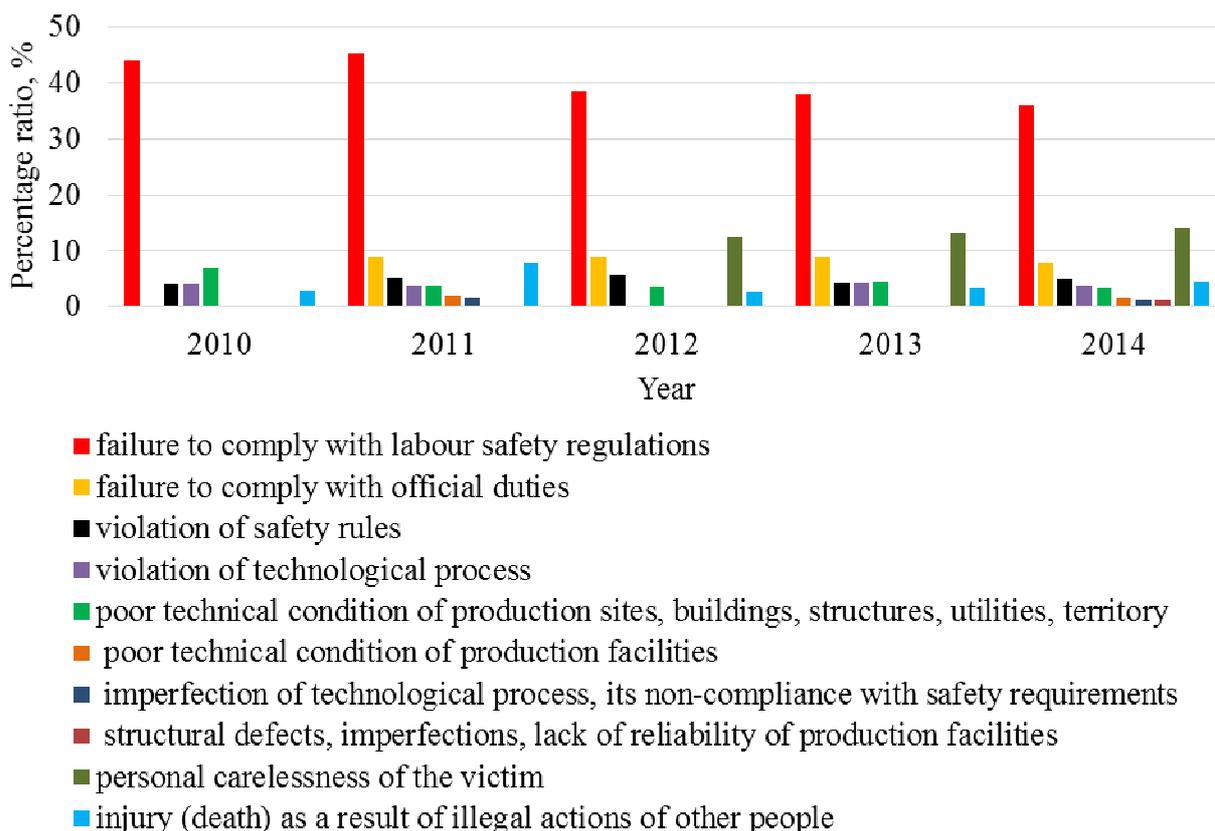
- failure to comply with labour safety regulations (40 %);
- failure to comply with official duties (9 %);
- violation of technological process (4 %);
- traffic violations (4.5 %);
- violation of safety rules (5 %).

Technical:

- poor technical condition of production sites, buildings, structures, utilities, territory (4.5 %);
- the imperfection of technological process, its non-compliance with safety requirements (1.4 %);
- structural defects, imperfections, lack of reliability of production facilities (1.3 %);
- poor technical condition of production facilities (1.7 %);

Psychophysiological:

- personal carelessness of the victim (13 %);
- injury (death) as a result of illegal actions of third persons (4.5 %).



**Fig. 5 – Distribution of industrial accidents by causative factors [6]**

Analysis of the above data shows that unlike certain reasons (poor technical condition of production facilities, structural defects, imperfections, lack of reliability of production facilities, imperfection of technological process, its non-compliance with safety requirements), that may not arise at the enterprises of the national economy during relevant reporting years, nonfulfillment (or improper fulfillment) of regulatory legal act requirements and official duties occurs constantly and has relatively stable proportion in the total structure of accidents (fig. 5).

The analysis allows to make the following conclusions:

1. The most common causes of industrial injuries are organizational, most of which in average total volume of accidents amounts 63 %.

2. In the structure of organizational reasons the first and the second place steadily occupy failure to comply with labour safety regulations and official duties as well as violation of technological process, safety rules, respectively.

This situation, according to authors, can be associated with two main aspects:

- negligence or deliberate failure to perform normative-legal documents on labour protection;
- inability to meet requirements of these acts for whatever reason.

Negligence or willful failure to comply with regulatory legal acts on labor protection refers to the sphere of production discipline, specifically to manifestations of the so-called "human factor", and will not be presented in this article.

The general analysis should be performed to determine reasons of non-fulfilling requirements of regulatory legal acts on labour protection. Within the research data, such analysis was carried out by the regulatory legal framework of Ukraine on labour protection for enterprises producing food and beverages, involving more than 50 inter-industry and industry-specific regulatory legal acts on labour protection.

Any technical system (TS) is characterized by life cycle, determined by the following main stages: idea, design, installation, operation.

Regulatory legal framework of Ukraine on labour protection is intended both for designers

and for persons operating TS. However, if errors are made while operating TS, they can be easily resolved after analyzing and developing appropriate measures, but errors made at the design stage of TS are practically not respond to correction.

So the analysis of hazardous and harmful production factors (HHPF), which according to recommendations of the international documents [7] is a fundamental basis for creating safe TS and whereby most errors are included as components of future TS, can not be conducted under existing legislation of Ukraine on labour protection and here's why.

ГОСТ 12.0.003 – 74 ССБТ including classification of hazardous and harmful production factors (HHPF) is the initial regulatory act, used by the TS designer with purpose of creating safe and comfortable working conditions. However, the regulatory legal framework of Ukraine on labour protection contains any technique that would become the logical sequence of GOST and will allow to conduct identification of classified and hazardous and harmful production factors (HHPF) of designed TS, with purpose of their further analysis. The absence of HHPF analysis procedure initiates certain errors related to the fact that some factors will not be taken into account while designing TS, and significance of others will be overestimated. Ignoring of certain factors promotes risks for industrial injuries occurrence and occupational diseases, and overestimation - leads to unwanted economic costs for development and implementation of appropriate measures and means on labor protection.

Safety of any TS in general is determined by its compliance with all requirements of regulatory legal acts, both special and labour protective (inter-industry and industry-specific).

Industry-specific acts hold a specific place in regulatory legal framework of Ukraine on labour-protection as far as they consider nature of technological processes at industrial enterprises to the maximum extent possible. Perfection and completeness of information content of acts, as well as proper execution of their requirements is a guarantee for creating safe, healthy and comfortable working conditions at the enterprise. It is also obvious that lack of information and its incorrect display affects the possibility and accuracy for execution of regulatory legal acts on labour protection. In other words, provided that production culture and discipline are high and all necessary regulatory legal acts on labour protection are available in the workplace, ill displaying of information (its absence, insufficiency), may cause accidents, occupational diseases and industrial accidents and disasters.

Analysis of the regulatory legal acts of Ukraine on labour protection for enterprises producing food and beverages, conducted by authors while writing series of manuals "Labor protection while designing technical systems of processing industry", found a number of shortcomings:

***1. Lack of criteria for quantitative estimation of certain indicators.***

The industrial safety rules for coastal fish-processing enterprises (НПАОП 05.0-1.05-06) state that "lightning in industrial premises with predominantly uniform equipment or with the same location in working surfaces area, should be standardized taking into account compulsory and regular cleaning of light holes glass for premises with significant dust, smoke and soot emission at least 4 times a year for rest premises – at least 2 times a year. Cleaning of illumination lights should be carried out at least twice a month and for premises with significant dust, smoke and soot emission – at least four times a month". However, the quantitative criteria for evaluating the level of dust and smoke content in premises is not clear enough.

Lack of criterion leads to subjective evaluation of relevant indicators and, as a result, can lead to various types of occupational diseases (visual organs, etc.), the increase of occupational injuries under conditions of limited visibility.

***2. Lack of necessary information in the relevant sections of regulatory legal acts.***

Information concerning the ratio between industry-specific specialties and relevant job categories classified according to the job difficulty grade is not specified in the industrial safety rules for fruit and vegetable processing enterprises (НПАОП 15.3-1.19-98), for workers of milk processing enterprises (НПАОП 15.5-1.05-99) and for the wine production (НПАОП 15.9-1.27-12) but reference to the ДЧН 3.3.6.042-99 is provided. However, ДЧН contain only general information regarding conditional works distribution into categories depending on the difficulty

grade. To exclude the subjective approach while determining the optimal and valid parameters of working zone environment, industry-specific regulatory legal acts on labour protection should contain comprehensive information on correspondence of industry-specific professions to works categories classified according the job difficulty grade.

A similar situation is observed with determining normalized values of daylight factor (КПО) and lightning (E) of working surfaces (stipulated by ДБН В.2.5-28-2006 Installation of services in buildings and constructions. Daylighting and artificial light). Specific data for determining these factors at the industry enterprises are not included in the regulatory legal acts on labour protection (НПАОП 15.9-1.27-12 and НПАОП Р 15.5-1.05-99).

Also some industry-specific regulatory legal acts on labour protection don't contain information regarding:

- requirements or recommendations concerning necessity and regulations for cleaning illumination lights and light holes glass (НПАОП 15.9-1.27-12 Industrial safety rules for wine production, НПАОП 15.8-1.14-97 Safety regulations for candy manufacture, НПАОП 15.8-1.27-02 Safety regulations for bread, bakery and macaroni production, НПАОП 15.5-1.05-99 Industrial safety rules for workers of milk processing enterprises);
- full classification of area according to fire and explosion hazard (НПАОП 15.1-1.06-99 Industrial safety rules for workers of meat processing plants, НПАОП 15.5-1.05-99 Industrial safety rules for workers of milk processing enterprises, НПАОП 15.9-1.27-12 Rules of labour protection for wine production, НПАОП 05.0-1.05-06 Industrial safety rules for employees of coastal fish-processing enterprises).

### ***3. Absence of procedures for performing relevant calculations.***

Safety regulations for candy manufacture (НПАОП 15.8-1.14-97), as well as for bread, bakery and macaroni production (НПАОП 15.8-1.27-02), with reference to the СНиП 2 0902-85 Industrial buildings, stated that "external easily thrown off enclosing structures, which area is determined by calculation should be provided for premises of A and B categories."

For flour-and-cereals enterprises one of the major aspects in ensuring fire-explosion safety is compulsory installation of certain type production facilities (augers, rotary crushers, dust catchers of aeration devices, etc.) with explosion vents, point filters, etc.

However, the regulatory legal framework of Ukraine contains any procedure for calculation area of easily thrown off structures, as well as design, deployment and operation of explosion vents, point filters (including СНиП 2.0902-85, referred to in НПАОП 15.8-1.14-97, НПАОП 15.8-1.27-02).

The absence of procedures inevitably leads to errors in respective calculations, followed by increasing the risk of explosions (fires) and causing significant destruction of load-carrying structures of industrial buildings and structures and, as a result, mass death of people at the enterprises having hazardous substances, mixtures and materials (flour, feed, etc.).

### ***4. Discrepancy between data of industry-specific regulatory legal acts and inter-industry.***

According to Electrical Installations Regulations (ПУЕ), explosive zones of production areas are divided into six classes marked as follows: 0, 1, 2, 20, 21 and 22. But applications to industry-specific regulatory legal acts on labour protection (НПАОП 15.8-1.27-02, НПАОП 15.8-1.14-97, НПАОП 15.3-1.19-98, НПАОП 15.9-1.13-97), with reference to the ПУЕ, contain quite different indications of explosive zones, namely B-Ia, B-Iб, B-IIa. Incorrect classification of hazardous areas, as shows practice of diploma design, is causing errors when choosing the electrical equipment with necessary level of explosion safety for processing lines.

**The General comment** to the regulatory legal acts on labour protection consists in the fact that most of them have been approved and put into effect in the 1990s and have not been revised more than a decade, and some of them more than a quarter of century (for example, НАОП 8.1.00-1.01-88 Health and safety requirements at the enterprises of grain storage and processing, ГОСТ 12.1.005-88 ССБТ General sanitary requirements for working zone air). The appropriate use of such acts, nowadays, causes doubt, since most modern enterprises have been upgraded using new TS which operation features are simply ignored by current regulatory legal acts on labour protection due to external factors.

This article demonstrates not a complete list of weaknesses of the regulatory legal framework on labour protection for enterprises producing food and beverages, but sufficient to form perspective directions for its improvement, namely:

- development of appropriate analysis procedure for hazardous and harmful production factors (HHPF), granting the status of regulatory act and incorporating it into the regulatory legal framework of Ukraine on labour protection.

- the mandatory inclusion of complete reference material regarding distribution of industry specialties according to characteristics of the visual performance, its categories and subcategories, classification of industrial premises according to fire and explosion hazard and electrical shock hazard to industry-specific regulatory legal acts; the ratio between industry-specific specialties and relevant categories of works according to the job difficulty grade, etc.

- development of specific scientifically grounded criteria for quantitative evaluation of sanitary parameters of working environment and their use in the relevant sections of industry-specific regulatory legal acts of Ukraine on labour protection.

- the introduction of uniform requirements to the structure and content of inter-industry and industry-specific regulatory legal acts on labour protection.

- creating a single automated system for analysis and updating of the regulatory legal framework of Ukraine on labour protection (*the authors filed a utility patent application*).

Implementation of this system will allow to introduce alternations in all legal acts, containing reference to act, while terminating (or making certain alterations to content) one regulatory legal act on labour protection thus ensuring compliance of industry-specific documents to inter-industry.

- development of regulatory legal acts (and their obligatory inclusion to regulatory legal framework of Ukraine on labour protection) with registration mechanism of mandatory certification of imported production facilities and manufacturing technologies. Certification of production facilities and technologies will certify their compliance to requirements of national regulatory legal acts on labour protection. This measure is necessary due to fact that requirements of regulatory legal acts for countries producing TS may significantly differ from Ukrainian, including maximum admissible concentrations and levels of certain hazardous production factors (noise, vibration, dust content etc.).

**Approbation of research results.** According to research results a utility patent application was filed.

Conducted researches allow to make **the following conclusions:**

1. Among the main causes of industrial accidents for the last 5 years the first place steadily occupy organizational, their average total proportion makes 63 %. The vast majority of organizational reasons associated with failure to comply with requirements of regulatory legal acts on labour protection for whatever reason.

2. Analysis of the regulatory legal framework of Ukraine on labour protection for enterprises producing food and beverages found a number of lapses in their structure, content and information filling and also a mismatch of industry-specific and inter-industry regulatory legal acts.

3. Improvement of regulatory legal framework of Ukraine on labour protection should be carried out in the directions relating to the regulatory legal acts unification, developing necessary procedures and

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4. 2. Elektronniy scientifically grounded criteria for quantitative evaluation, creating a single automated system for analysis and updating, as well as the developing documents for TS certification.

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