

Ministry of Education and Science of Ukraine
Kyiv National University of Construction and Architecture

Fundamentals of labor protection

Methodical instructions
for the execution of a control task
for students of the first (bachelor's) level
of higher education of all specialties

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Contain general provisions, individual tasks and literature list

Methodical instructions are intended for students of all specialties of all forms of study.

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Містять загальні положення, індивідуальні завдання та список літератури

Призначені для здобувачів першого (бакалаврського) рівня вищої освіти усіх спеціальностей.

General provisions

Methodical instructions are drawn up in accordance with the curriculum of the normative discipline "Fundamentals of labor protection" for higher education institutions.

The program of the discipline "Fundamentals of Occupational Safety" is developed taking into account that the study of labor protection issues in higher education institutions is carried out at two levels: in the preparation of bachelors and masters.

General engineering and profile courses were considered in relation to specific engineering structures and carrying out individual construction works. In the course of "Fundamentals of Occupational Safety", these conditions are studied on the basis of analysis of causes of injury, occupational diseases, generalization of experience in work on labor safety, as well as on the basis of identifying the best engineering solutions that provide safe methods of work in production.

The volume of the material to be studied for the assimilation of the course include: educational and methodological literature, regulatory acts on labor protection (NAPOP), building norms and regulations (DBN), regulations Organization of construction (PO) and projects of works (PVR) - that is, documents of organizational and technological nature.

When studying literature, regulatory and instructional documents, it is recommended to keep a synopsis that is necessary in the course of the control work.

Reading monthly scientific, technical and production magazines issued in Ukraine ("Construction of Ukraine", "Labor Protection", "Life Safety", etc.) can be significantly assisted in the course of studying the course.

The sequence of study of the course is listed in these recommendations; It is only after learning the previous topic after learning the previous topic.

Knowledge control on each topic is answered by answering questions for self -testing. The answers should be complete, specific and, where necessary, accompanied by sketches and calculations. In cases where there is a doubt about the correct answer, a teacher of the department should be advice. Consultation can also be obtained from specialists at the place of work.

It is advisable to study those projects where the issues of labor safety are most reflected.

In order to consolidate theoretical knowledge, it is necessary to study in practice methods of ensuring safety directly in the conditions of construction production.

After completing the course of the course, the student performs and sends the KNUBA to the review of the test work (individual task).

It should be noted that during the academic year and during the examination and laboratory session at the university reads review lectures from the main sections of the course and conduct practical and laboratory classes.

The exam (credit) is taken on the condition of receiving a positive review of the control work (individual task).

The program is compiled in accordance with construction specialties in accordance with the curriculum of the normative discipline "Fundamentals of labor protection" for higher education institutions.

During the exam (test), the student is obliged to identify deep knowledge of all theoretical and applied question of the course and the ability to use them independently when solving engineering issues regarding the prevention of injury and occupational diseases, as well as in the field of fire prevention.

INTRODUCTION

Subject and method of life safety and occupational safety. The content of the course, its connection with general and special disciplines. The impact of healthy and safe working conditions on improving labor productivity. Technical processes and labor protection.

Methodical instructions. In the course of studying the course, it should be borne in mind that the introduction into the practice of production of market relations involves significant intensification of labor, a significant increase in its productivity.

In modern production, as a rule, a complex probabilistic system - ensuring labor protection is a sphere of human activity, a holistic system of knowledge about humans, society, production relations, methods and means of protection of humans from the influence of dangerous and harmful production factors, which has its logic.

Improvement of labor safety methods is one of the reserves of improving production efficiency, because injuries and occupational diseases make up a significant part of unproductive losses of working time, and the fight against them, in addition to humanistic direction, has a clear economic aspect.

The UN concept on "constant human development" is considered as one of the basic (basic) human needs, so the purpose of the concept is to create the conditions for the balanced safe existence of the present and future generations. The purpose of any technological, organizational and other transformations of production is to increase labor productivity, to increase its efficiency. However, high labor productivity can only be achieved with safe working conditions. The priority of life and health of workers over the results of production activity of enterprises is one of the main principles of state policy in the field of labor protection, and the creation of comfortable and safe working conditions - is a motivation for labor protection.

The complex nature of the influence of factors of the production environment determines the need for a comprehensive systematic approach in solving the issues of prevention of industrial injuries and occupational diseases. In this regard, it is urgent to think about the need to form a culture of labor safety at the stages of design, manufacture and operation of products, about the creation of technologies with internal safety.

Section 1. Legal and Organizational Fundamentals of Occupational Safety

Theme 1.1. Fundamentals of Ukraine's legislation on labor protection

Constitution of Ukraine, Law of Ukraine "On Labor Protection", Labor Code of Ukraine, Law of Ukraine "On Compulsory State Social Insurance". Rules and regulations on labor safety and industrial sanitation. Regulatory and technical documentation: inter-sectoral, sectoral, enterprises and organizations. Occupational safety instructions.

Occupational safety standard (SSBP). Standards of labor safety enterprises.

State supervision and public control over labor protection. Rights, obligations and responsibilities for violation of legislation and regulations on labor protection of officials, representatives of state supervisory bodies for labor protection.

Functional responsibilities of officials and workers to ensure safe working conditions.

Labor protection of women, minors and disabled. Guarantees of citizens' rights to labor protection. Benefits and compensation. Compensation for damage to the victim.

Methodical instructions. Having studied the materials of the topic, the student is obliged to acquire knowledge in the field (sphere) of the production legislation of Ukraine, necessary for compliance with the laws on labor protection on construction, as well as for responsibility for violation of these laws.

In addition to studying the literature recommended for studying the topic, you need to familiarize yourself with the relevant articles of the Labor Code of Ukraine.

Questions for self-control

1. What laws regulate labor relations in Ukraine?
2. What articles of the Labor Code of Ukraine guarantee safety and harmlessness of work?
3. How is state and public control and supervision over the implementation of labor protection legislation?
4. What is the responsibility of the officials of construction organizations for violation of labor protection legislation?
5. What are the basic regulatory documents on occupational safety in construction organizations?

Theme 1.2. Organizational foundations for creating safe working conditions in production

Sources of environmental pollution, the consequences of negative effects of dangerous and harmful environmental factors. Classification of dangerous and harmful production factors.

Organization of occupational safety service. Types of control and supervision of occupational safety. Control bodies. Organization of occupational safety training, types of instruction. Planning and financing of occupational

safety. Economic efficiency of labor protection measures. Regulation of labor protection issues in the collective agreement, agreement.

Methodical instructions. It should be borne in mind that human production activity in some cases adversely affects the environment, polluting it. The effectiveness of preventive measures in many cases depends on how accurately classified this contamination is.

The issue of development of preventive measures, according to the current legislation, is entrusted to the labor protection service. The state of working conditions at enterprises and organizations is controlled by representatives of state supervision and control bodies, as well as representatives of public organizations.

The employer at its expense is obliged to provide, according to the Law of Ukraine “On Occupational Safety”, during hiring and in the process of work, training, training on labor protection, first aid to victims of accidents and rules of conduct in the event of an accident.

Of great importance is the economic efficiency of investing in labor protection, which as a whole depends on the level of competence of the labor protection service.

A real tool for improving working conditions can be regulation of labor issues in the collective agreement (agreement).

Questions for self-control

1. What are the sources of environmental pollution in construction?
2. What production factors belong to the physical group?
3. What production factors belong to the biological group?
4. What production factors belong to the psychophysiological group?
5. What are the responsibilities of administrative and technical personnel in the field of occupational safety?
6. What are the rights and obligations of the occupational safety service?
7. How is employees training?
8. How is planning for labor protection measures in construction?
9. How is labor protection issues regulated in the collective agreement, the agreement?

Theme 1.3. Investigation and accounting of accidents, occupational diseases and crashes at production

The concept of accident and occupational disease, their viable nature. The composition of the commission on their investigation. The act of accident.

Organization and investigation of accidents and occupational diseases. Special investigation of accidents, formation of special investigation commissions and their functions. Terms of investigation. Features of accident investigation, accident classification, composition of commissions. Analysis of industrial injuries and occupational diseases - purpose, methods, causes, main technical and organizational measures for the prevention of industrial injuries and occupational diseases. Information reporting on the state of labor protection.

The concept and magnitude of the level of production risk, methods of its definition. Causes of refusals, criteria and methods of evaluation of dangerous situations; "Tree of reasons", "Tree of events", "Tree of refusals". Fundamentals of forecasting and modeling of conditions of dangerous situations.

Methodical instructions. It is known that traumatism determines a significant part of unproductive working time, which negatively affects the efficiency of construction production. Therefore, it is extremely important to organize the proper organization of accidents and occupational diseases. Investigation materials, results - the causes and factors, circumstances that led to the creation of dangerous situations implemented in accidents - the initial information for engineering decisions during periods of designing safe methods of work and their implementation in practice.

When analyzing accidents, it should be remembered that they are not accidental phenomena due to technical, organizational, psychophysiological and other reasons. The task of the analysis is in a timely detection, study of these causes and development of recommendations for the prevention of manifestation of identified factors with the accounting of specific production.

The formulas for calculating the frequency and severity of accidents should be known by the student.

Questions for self -control

1. What is an accident in production?
2. What is a professional disease?
3. What should be understood by the term technical causes of injury?
4. What should be understood by the term organizational and psychological causes of injury?

5. How is the organization and investigation of accidents?
6. How is the accident organization and investigation?
7. What kinds of trauma and occupational disease analysis are used in construction and what are their indicators?
8. What should be understood by the term of production risk?
9. What methods of determining production risk do you know?
10. What is the basis of modeling and predicting conditions for dangerous situations?

Theme 1.4. Fundamentals of Occupational Safety Management in Construction

Public Administration of Occupational Safety. Ensuring a systematic comprehensive approach to solving labor protection issues. Basic provisions, organizational structure, basic management functions. The responsibilities of the owner of the enterprise for occupational safety management.

Economic evaluation of activity in the field of labor protection.

Methodical instructions. In the conditions of modern construction production - a complex high -dynamic probabilistic system - the solution of the problem of ensuring safety of labor can be obtained only on the basis of a comprehensive systematic approach, which takes into account the diversity of relationships in the system "man - machine - environment". This approach is ensured by creating a system of occupational safety management (SUP) - a subsystem of the construction production management system, the targeted function of which is to create safe and harmless working conditions, the maximum reduction of the level of industrial injuries at the reached level of technology, technology and organization of construction production.

Questions for self -control

1. What is the essence of occupational safety management?
2. What is the organizational structure and basic functions of occupational safety management?
3. What relates to the OSC Operational Documentation?
4. How is the SUP's performance evaluation?

Chapter 2. Fundamentals of Physiology, Occupational Health and Production Sanitation

Theme 2.1. General provisions

Law of Ukraine “On Ensuring Sanitary and Epidemic Well -being of the Population”. Its main requirements for organization, placement of production and creation of working conditions that meet the sanitary requirements. Fundamentals of industrial sanitation and work hygiene in construction. The concept of "production sanitation", its meaning. Factors that determine the sanitary and hygienic features of construction production. A general approach to assessing working conditions. Professional harm and occupational diseases of builders. Classification of occupational harm. Sanitary norms of design of industrial enterprises.

Methodical instructions. The main thing when studying this topic is to know the principles of classification of occupational hazards in construction. It is necessary to get acquainted with the SSN 3.3.6.042-99 "State sanitary norms of the microclimate of production premises", and GOST 12.1.005 - 88 "Common sanitary -hygienic requirement for the air of the zone".

These documents provide information on the maximum permissible concentrations of harmful substances in the air of the working area, the temperature, relative humidity and speed of air movement in the production premises; Production classification is given, as well as the minimum size of protective zones.

Questions for self -control

1. Name the rights and responsibilities of citizens, enterprises to ensure the sanitary and epidemic well -being of the population.
2. Give the factors that determine the sanitary and hygienic working conditions.
3. What is the maximum classification of empty cement concentration in the air of the working area?
4. How are the sanitary zones of enterprises determined?
5. What premises are classified by the project production project for working classification for the girl?
6. How is the classification of state sanitary and epidemiological supervision?

Theme 2.2. Fundamentals of Labor Physiology and Comfortable Life Conditions

Classification of the main forms of human activity. Physical and mental work. The concept of optimal, permissible, harmful and dangerous working conditions. The main ways of ensuring comfortable living conditions (work); Organization of workplace. Rational modes of work and rest.

Heaviness and intensity of work. Static and dynamic efforts. Muscle work. Methods for assessing labor severity. Human energy costs in different activities.

Anatomical and physiological action on humans of dangerous and harmful production factors. Human natural systems to protect against the effects of dangerous and harmful production factors. Characteristics of the nervous system. Conditional and unconditional reflexes. Characteristics of analyzers. Human reaction time for irritants. The principle of determining the maximum permissible actions of harmful and dangerous production factors. Assessment of working conditions, certification of jobs, working conditions.

Methodical instructions. Creating comfortable working conditions to some extent depends on the forms of human activity. Comfortable conditions are fundamentally different in physical or mental work. However, the main provisions of development of modes of work and recreation have a lot in common. It is necessary to take into account the difficulty and intensity of work, the share of static and dynamic efforts, energy costs of a person in specific activities. In order to protect humans from harmful and dangerous production factors, its natural systems, conditional and unconditional reflexes, rate of response to the action of irritants are of great importance.

Questions for self-control

1. Give a classification of the main forms of human activity.
2. Why are working and recreation modes developed?
3. How is the difficulty and intensity of work determined?
4. What work belong to the moderate category?
5. What kind of human natural systems protect it from the effects of harmful and dangerous factors of the production environment?
6. What allows the introduction into the practice of building rational modes of work and recreation?

Theme 2.3 Fundamentals of ergonomics and engineering psychology

Tasks and content of ergonomics. Ergonomic bases of labor protection on construction. Five compatibility. Comfort diagram. Rational organization of the workplace. Production requirements. Technical aesthetics. Features of work of women and adolescents. Professional selection and orientation in construction.

Methodical instructions. Without machines and mechanisms, modern production is impossible, but they are a source of a large number of dangerous and harmful production factors. Effective use of machines, in turn, depends on how adapted they are. Therefore, the compatibility of machines and people's capabilities is of particular importance.

The production process of many professions occurs in production facilities, so its efficiency is largely related to how much they meet consumer qualities and aesthetic requirements.

It should be remembered that fatigue gradually accumulates in the work process - the reason for reducing labor productivity and one of the main causes of occupational injuries. Therefore, the prevention of fatigue, the rational organization of modes of work and recreation are of great importance for improving work efficiency.

Questions for self-control

1. What are the problems of ergonomics science?
2. What is the essence of a person's compatibility problem with a car?
3. What is the rational organization of the workplace?
4. What are the features of using women and adolescents?
5. What is professional selection and construction orientation?

Theme 2.4. Meteorological conditions of production environment

Hygienic normalization of microclimate parameters of production premises. Systems of microclimate parameters: heating, ventilation, air conditioning. Requirements put forward to the microclimate parameters.

Physiological action of meteorological conditions on the human body. Acclimatization in conditions of hypothermia and overheating.

Increased and reduced atmospheric pressure, its effect on the human body. Methods of control and their metrological support. Prevention measures.

Methodical instructions. One of the peculiarities of construction works to be recorded in the organization of construction - the performance of work outdoors in different climatic conditions. Understanding the physiological action of meteorological conditions on the human body makes it possible to properly evaluate their impact on the body of the worker and to develop effective measures and means of protection of a person in the process of work from the action of this factor. Of great importance are methods of control of the state of meteorological conditions and their metrological support.

Questions for self -control

1. By what parameters are the meteorological conditions of production premises?
2. How is thermoregulation of the human body?
3. What are the indicators of the premises microclimate?
4. What microclimate setting systems do you know?
5. What devices are used to practically determine the microclimate parameters?
6. What devices are used to determine relative humidity?
7. What technical prevention measures are used to normalize meteorological working conditions?

Theme 2.5. Harmful substances in the air of the work area

Classification of harmful substances. Their normalization and definition. Dependence of harmful effects on chemical structure and physical properties. The combined effect of harmful substances and physical factors toxic impurities of water and soil, their impact on human health. Production under the action of toxins. Protection against toxic emissions. The main methods of determining the content of harmful substances in the air of the working area. Normalization. General and individual means of protection against poisoning in production. Prevention of occupational poisoning and diseases.

Methodical instructions. In natural conditions, air - one of the most important factors in ensuring human life - is usually not contaminated with poisonous substances and therefore does not threaten human life. However, since the activity of a person began to use harmful substances that, through the respiratory tract, enter the lungs, air (atmosphere) has become a source of danger to our lives. At the same time, it was found out that the sensitivity bodies do not allow in time to determine these factors and prevent the threat of poisoning. The reaction of the body occurs delay when the poison has already accumulated in the human body in large quantities. Therefore, in practice, they use hygienic normalization of harmful substances, which allows to develop reliable ways to protect humans from them.

Questions for self-control

1. What are the main tasks of modern toxicology?
2. What should be understood by the term "professional poisoning"?
3. How do you classify harmful substances by the degree of danger?
4. How are harmful substances divided by the degree of action on the human body? What are the classes of dangers?
5. What is the maximum permissible concentration (MPC) of a harmful substance?
6. How are the MPC determined by simultaneous finding in the air of the work area of several harmful substances of unidirectional action?
7. What methods of air pollution control do you know?
8. What are the general means of combating poisoning in construction?
9. What individual means of protecting workers from harmful substances are used in construction?

Theme 2.6. Production dust as a professional harmfulness

Sources of dust formation in production. Assessment of dust harm, its maximum permissible concentration (MPC) in the air of the working area. Normalization. Methods of control of dust content in the air of the work area. Methods of purification from dust (dust suppression and dust). Individual dust protection.

Methodical instructions. A number of construction processes are accompanied by dust, which in the absence of protection from it can lead to skin disease, respiratory tract, lungs, as well as irritation of the mucous membranes, eyes. The maximum - permissible concentrations (MPC) in the air of the working area are set out in GOST 12.1.005 - 88 "General sanitation -higenic requirement to the air of the zone".

Questions for self -control

1. What do you know about the harmfulness of dust and the features of dust pollution?
2. What methods of determining dust pollution do you know?
3. What are the main sources and properties of dust that stands out on the construction site?
4. What are the main types of filters and dust collectors used to purify the air?
5. How do dusting chambers and cyclones work?
6. How do electrical filters work?
7. What individual human protection measures are used to protect against industrial dust?

Theme 2.7. Noise protection and vibration

Sources of noise and vibration at the enterprises of the construction industry. The noise is constant and unstable, its effect on humans. Occupational diseases from noise, infrasound; The danger of their joint action. Audiometry. Normalization. Methods of protection and reduction of noise level. Aerodynamic noise mufflers. Individual noise protection. Infra- and ultrasound, maximum permissible levels are possible. Ultrasound protection.

Types of vibration, their effect on humans, vibration disease. The main sources of vibration in the construction and industry of building materials. Vibration normalization. Methods for combating mechanical and acoustic vibrations. Vibro isolation. Vibration absorption. Types of shock absorbers. Dynamic vibration extinguishers. Vibration personal protective equipment.

Metrological support of noise and vibration.

Methodical instructions. Much of construction workers have occupational diseases that are determined by the action of noise and vibration.

The limiting levels of sound pressure and sound levels in permanent workplaces and in the territory of residential development are given in SES 3.3.6.037-99 “State sanitary norms of industrial noise, ultrasound and infrasound”.

The normative document regulating the effect of vibration on the human body is SSN 3.3.6.039-99 “State sanitary standards of production general and local vibration”.

In recent years, the share of monolithic home construction has increased significantly. Concrete seal in construction sites is associated with the use of vibration tools and vibrating equipment, which determines the need for increased attention to human protection during work.

As a rule, engineering solutions to protect workers from noise and vibration should be carefully worked at the stage of design process.

Questions for self -control

1. What is sound, noise? Give their basic characteristics.
2. What is vibration? Give its basic characteristics.
3. Define the concepts of "sensitivity threshold", "pain threshold", "logarithmic scale for determining noise levels".
4. What is hygienic noise normalization?
5. Define the concept of "spectral noise analysis".
6. What is the sound insulation method?
7. What is the sound absorption method?
8. Infrasound, ultrasound, their characteristics, human danger and protection methods.
9. What is vibration and what is it dangerous for humans?
10. What is the hygienic normalization of vibration?
11. What is the parameter evaluated the effectiveness of the vibration insulation system?
12. In which cases is it advisable to use the bases for extinguishing vibration?
13. Why do massive foundations extinguish vibration?
14. What are the advantages and disadvantages of different types of shock absorbers.

Theme 2.8. Ionizing radiation

Natural and artificial sources of ionizing radiation. Characteristics of ionizing radiation (s). The action of ionizing radiation. Types of IV in the production, household and environment. Use of radioactive substances in construction.

Normalization of IV. Basic principles and ways of ensuring radiation safety and against radiation protection during the organization of work with sources of IP in construction. Conducting dosimetric control and its metrological support. Personal protective equipment (PPE) and special hygiene while working with IV.

Methodical instructions. Ionizing radiation exists throughout the existence of Earth. The peculiarity of ionizing radiation is that they are all noted by high energy and cause changes in the biological structure of cells that can lead to their death. It should be noted that the effects of ionizing radiation do not respond to human senses. Studies of radioactive radiation have made it possible to establish their dangerous properties, which can lead to the development of complex and irreversible physical, chemical and biological processes in the human body, impaired normal biochemical reactions and metabolism. Depending on the absorbed dose of radiation and the individual characteristics of the body, caused changes may be reverse or non -reverse.

Protection against radioactive radiation consists in determining the maximum permissible doses-GDDs of radiation, development and introduction into practice of necessary measures of human protection, organization of work with radioactive substances in accordance with current rules, rules (NRBU-97/D-2000) and instructions developed on the basis of these documents.

Questions for self -control

1. What is the nature and types of ionizing radiation?
2. What is the danger of ionizing radiation?
3. What kind of injuries cause radioactive radiation in the human body?
4. The maximum permissible dose system is given in the NBU-97 \ D-2000.
5. What are the basic principles and ways of ensuring radiation safety?
6. What are the main methods of protecting workers in the organization of work with sources of IP in construction?
7. How is the dosimetric control during radiation of work with IPs.

8. Identify the requirements for personal protective equipment while working with IV.

Theme 2.9. Electromagnetic radiation

General characteristics of electromagnetic radiation (EMV). Sources of electromagnetic fields (EMF) of natural and anthropogenic origin. EMF of natural origin, their impact on biological objects, the human body. Normalization of EMV of radio frequency-band. Protection of employees from the action of EMV, use of individual means of protection.

Methodical instructions. Sources of electromagnetic fields can be natural and anthropogenic. EMF of natural origin exists around Earth. It decreases from medium latitudes to poles and to the equator, as well as with distance from the earth's surface. During human evolution, her body was able to adapt to the influence of such fields and to develop a mechanism of partial protection against possible damage due to natural factors. The sources of EMF of anthropogenic origin are industrial electrical equipment, radio transmission devices, household equipment. EMPs spread in the form of electromagnetic waves, which are characterized by wavelength, oscillation frequency, speed of distribution.

The impact of EMF on the human body is mainly negative, so the protection of employees from EMF is given great attention. Protection against the action of EMF is carried out by normalizing the time of stay of the person in the area of EMF, reducing the power of radiation sources, workplaces, removal of dangerous zones, use of individual protection protection. Medical and preventive measures are of great importance.

Question to self -control.

1. Name the EMF sources of electro -magnetic fields of natural origin and their effect on humans.
2. Name the sources of EMF of anthropogenic origin and their effect on humans.
3. What methods of protection against EMF on the body of workers are most effective in the construction site?
4. How is the radio frequency range rationing?
5. What types of PPEs are used to protect against EMF?
6. What are therapeutic and prophylactic measures from the action of EMF?

Theme 2.10. Radiation of the optical range

Sources of radiation of the optical range, their types. Characteristics of infrared radiation (IRV), its impact on humans. Normalization of IRV. Protection of employees from the action of IRV.

Sources of ultraviolet radiation (UVV). Characteristics of UVV, its impact on humans. UVV normalization. Protection of employees from UVV.

Laser radiation sources (LV). Characteristics of LV, its impact on humans. Normalization of LV. Protection of workers from the action of LV.

Methodical instructions. The radiation of the optical range includes infrared, ultraviolet and laser radiation. IRV occurs where the temperature is above absolute zero, and is a function of the thermal state of the radiation source.

IR radiation sources are divided into natural and artificial (for humans, a temperature with a temperature above 36-37°C). The body of IRV has thermal effect on the human body. The effect of the action of IRV depends on the wavelength, which causes the depth of penetration. The range of IRV is broken down into three areas A, B, C: A-short-lived, B and C-long-wave.

IRV normalization is carried out in accordance with SSN 3.3.6.042-99 "State sanitary norms of microclimate of industrial premises".

Ultraviolet radiation (UVV) in the electromagnetic spectrum is between thermal and penetrating radiation - this is the electromagnetic waves of which lies in the range of 380-10 nm. At the same time distinguish near UVV (380-200nm) and far or vacuum UVV (200-10 nm) and the visible section of the spectrum of electromagnetic waves 380-760 nm. Impact on employees can only create a nearby UVV; The most powerful - at a wavelength of 254.6 nm (bactericidal radiation); The tissues are harmful because it is able to tone the molecules that are part of them. UVV is intensively absorbed by the surface of the human skin and thus the death of skin cells, changes in their size and shape, irritation of the nerve endings located in the upper layers of the skin. UVV with a wavelength of 280-303 nm contributes to the formation of cancers. Repeated, prolonged irradiation accelerates the skin aging process. UVV is a danger to the organs of vision.

UVV rationing in production premises is carried out in accordance with CH 4556-88 "Sanitary standards of ultraviolet radiation in production premises".

To protect employees from UVV action use: protection of distance, shielding of workplaces, personal protective equipment (PPE), special painting of premises and more.

Laser radiation (LV), the main feature of which is determined by the fact that LV has a small angular discrepancy, which allows to achieve extremely large radiation densities in small areas. This property of LV determines its widespread use in the processing of superhard materials, microstructures, collection of circuits, biology, medicine, spectroscopy and computing and other areas of use. When exposed to high -intensity LV, biologically distinguish thermal and shock effects. The shock effect is especially dangerous because it occurs when the impulse LV is used, which leads to a shock wave. Under the action of LV, the shock wave occurs both on the surface of the body and in the internal organs, which can lead to the destruction of internal organs without external signs. The action of LV of low intensity often leads to various functional disorders in the work of the central nervous, cardiovascular system, endocrine glands. Particularly dangerous is the effect of LV on the eyes.

The normalization of LV is carried out according to DSTU EN 60825-1: 2016 the free laser. The protection against the action of LV depends on the class of laser installations. At the same time use enclosures, screens, restrictions on access to the laser area, special eye goggles.

Questions for self -control.

1. What are the main features of LV laser radiation?
2. What is the action of LV on biological objects?
3. How is LV normalization?
4. How is the LV workers protected?
5. What are the basic features of academic?
6. What is the action of academic studies?
7. How is academic normalization?
8. What is the protection of workers from the action of ultra red radiation of academic studies?
9. What are the features of ultra purple radiation UVV?
10. What is the action of UFV on biological objects?
11. How is UVV normalization?
12. How is the UFV workers protected?

Theme 2.11. Production lighting

Lighting as a factor of labor protection. Lighting concepts and definitions. Units of measurement. Production lighting requirements. Natural lighting. Lamplight. Rationing and calculating the lighting of the construction site and workplaces.

Methodical instructions. The state of illumination of industrial premises, territories of construction sites and workplaces plays an important role in the prevention of industrial injuries. In production, depending on the type of work performed use natural, artificial and mixed lighting.

Questions for self-control

1. What is the value of light for human performance and health?
2. What are the lighting parameters measured?
3. What kinds of lighting do you know?
4. What devices measure the lighting?
5. How is natural lighting normalized?
6. How, depending on what factors are artificial lighting normalized?
7. What kinds of lighting sources are used in construction?
8. What are the parameters characterized by lamps?
9. Give the method of calculating production lighting by the dowel method.
10. What is the essence of the production lighting calculation by the use factor?
11. How is the artificial lighting by the specific power?

Chapter 3. Fun Works

Theme 3.1. Provision of occupational safety during the design, construction and reconstruction of buildings, structures, objects and enterprises

Basic definitions and concepts. Fundamentals of technical safety. Reflection of labor protection issues in project documentation. List of labor protection issues, which are resolved in organizational and technological design documentation - in projects of construction organization (POP) and projects of works (PVR). Occupational safety in the development of technological maps. Labor protection in calendar plans and net schedules; When designing master plans. Ensuring labor safety at the construction site in different periods of construction.

Sanitary requirements of design standards of industrial enterprises of the construction industry. Sanitary premises at enterprises and construction sites.

Methodical instructions. Design of construction objects, development of new technologies and means of production should be carried out taking into account the requirements for occupational safety. In turn, labor protection begins with the project, so at all stages of design it is necessary to solve the issue of ensuring safe and harmless working conditions.

Of particular importance for the safety of construction works are documents of projects of organization of construction (POP) and projects of execution of works (PVR).

Sanitary premises are designed depending on the sanitary characteristics of the production process, the number of working men and women in accordance with DBN A.3.2-2: 2009. «SSBP. Labor protection and industrial safety in construction. Basic provisions» and DBN A.3.1-5-2016. «Management, organization and technology. Organization of construction production». According to the standards, all workers must be provided with household premises, canteens, recreation rooms, showers, medical cities and other sanitary facilities.

Questions for self-control

1. What is the source material for developing labor protection issues in project documentation?

2. What issues of labor protection are resolved when designing technological maps?
3. What issues of labor protection are resolved when designing a construction master plan?
4. What are the issues of occupational safety resolved when designing calendar plans and net schedules?
5. What depends on the dimensions of dangerous zones when operating tower and arrow -propelled cranes?
6. How are dangerous areas determined when designing installation mechanisms?
7. What issues of labor protection are resolved in the design of PAP and PVR?
8. What are the parameters determined by the number of sanitary premises?
9. What factors determine the placement of sanitary facilities on the construction site?

Theme 3.2. Electrical safety

The effect of electric current on the human body. Types of human damage by electric current. Conditions and reasons for which electrotraumatism is possible. The person's inclusion in the power grid is possible. The phenomena that occur when the electric current is drained into the ground. Analysis of the danger of human damage to various electrical networks.

Causes of electro - traumatism in construction. Classification of premises, construction and installation work and electrical equipment on the danger of lesions of people with electric current.

Performing work in security areas and near transmission lines. Use of temporary power grid, portable current collectors, inventory devices for connecting current collectors, as well as reducing transformers on the construction site.

Individual and collective protection. The first aid for human damage.

Protection of houses and structures from lightning.

Methodical instructions. According to statistics, electric trauma in general production injuries is about 1%, and in the deadly - 15% or more. It should be noted that every year electricity is increasingly used in everyday life. At the same time, the annual amount of electric trauma in everyday life is much exceeding electric traumas. With the population of Ukraine less than 1 % of the world, the number of deadly electric traumas exceeds 6 % of the world, which indicates the need for serious attitude to the prevention of electro -traumatism in Ukraine. The focus of the speed is to the study of engineering means of human protection against electric shock, because all types of voltage used in construction machines, mechanisms, equipment and for illumination of construction sites are dangerous to life. Of particular importance is the mandatory ability to provide first aid in the construction sites, because the time of its implementation is limited by the speed of functioning without oxygen of the human brain.

Questions for self -control

1. What is electric trauma?
2. What is electrical safety?
3. What features are characteristic of electro -traumatism?
4. How does an electric current act on the human body?
4. Name the possible types of electric trauma and give them a general characteristic.
5. What are the threshold values of the electric current?
6. Give the classification of premises by the hazard of electric trauma.
7. What determines the nature of the potential distribution on the Earth's surface in the current spreading zone?
8. What is the step stress? What determines its size?
9. What are the components of a person through a person when it touches the non -insulated parts of the active power grid?
11. Name the three systems and electrical safety measures.
12. List the main technical means of maintaining electrical safety in normal operating modes of electrical installations.
13. How does protective grounding function and what its efficiency depends on?

14. What depends on the permissible and actual resistance of the leaning device current?

15. What is the essence of the sealing of electrical installations and what is the scope of its use?

16. Name the main electric protection agents and their classification.

17. Give safety measures when organizing and lighting the construction site.

18. Give safety precautions when applying electrical heating for concrete.

19. What is the principle of protection of houses and structures from lightning?

20. Requirements for training and testing of knowledge of electrical staff.

21. What is the first aid for electric shock?

Theme 3.3. Ensuring safe operation of main building machines

Design solution - stability of machines, devices and security devices; Requirements for the design of machines.

Basic safety requirements for installing construction machines on the construction site. Safety devices when operating the main lifting machines and mechanisms.

Cargo and capture devices, shooting freight devices and containers. Operation of cargo and capture devices, registration, commissioning, technical inspection, supervision and maintenance, performance of works. Transportation of machines, safety during repair of construction machines.

Methodical instructions. Without machines, modern production is impossible, but they bring to the production environment the largest number of dangerous and harmful production factors,

The construction uses a variety of construction and road machines. When designing these machines, the main engineering solutions for occupational safety are mandatory, namely enclosure, precautions, alarm means, arrangements that carry out normal meters, means of elimination of noise, vibration, dust and gases.

When operating machines and mechanisms, the main condition for their reliable work is the use of planned preventive repairs, ie periodic inspections and timely repair.

However, sometimes during the operation of machines there are conditions when the means installed in the design of the machine are not enough. In these cases, the operators of the machines should use personal protective equipment (31Z).

Security measures at the same time:

- 1) detection of dangerous zones;
- 2) observance of gaps and dimensions of safety;
- 3) installation of warning and other safety signs.

For specialists, the focus should be on the creation of dangerous and harmless working conditions in the operation of lifting machines and rigging.

Questions for self -control

1. How is the crane stability ratio calculated?
2. What is the procedure for admission of cranes for operation?
3. What are the requirements of the tower cranes tracks?
4. How is the personal stability of the hoisting crane calculated?
5. Why don't you use hoisting lifts and cranes to move people?
6. Depending on what are the dimensions of "dangerous zones" when operating excavators, lifts, cranes?
7. What are the conditions for admission to the service of construction and road machines?
8. What are the boundary conditions for installing an arrow tap near transmission lines?
9. What are the safety devices installed on the rail tracks of the tower crane?
10. What security devices are installed on hoisting cranes?
11. How does the system of planning and preventive repairs of construction machines affect the conditions of their safe operation?
12. Why can the load be lifted by lifting machines with the help of turning the arrow or oblique tension of the ropes?

Theme 3.4. Safety of operating vessels and pressure systems

The causes of explosions and accidents and their possible consequences. Requirements for structures of pressure vessels; Materials, manufacturing, installation, repair. Fittings, devices and power supplies. Room for boilers. Installation of registration Technical inspection of vessels, permission for operation. Supervision, operation, maintenance and repair. Technical inspection and power supply of vessels. The basic requirements of safe operation of steam and water boilers, compressor stations, acetylene generators, as well as cylinders for compressed, liquefied and dissolved gases.

Safe methods of gas processing of materials. Safe installation of internal sanitary equipment. Safe ways of performing sanitary work in existing conditions. Safe methods of execution of transport and loading and unloading works.

Safety during operation of water and sewage structures. Safety precautions for disinfection and ammonia of water.

Safety of operation of boilers, economizers, steam overheated. pipelines. Safety and signaling devices of boilers.

Safety during gas operation: underground gas pipelines, gas regulatory points, gas equipment of residential buildings, boiler houses and industrial furnaces.

Methodical instructions. Pressure vessels are sealed containers that are intended for conducting chemical, thermal and other technological processes, as well as for the storage and transportation of gaseous, liquid and other substances under excess pressure. These include steam and water -heating boilers, compressors, cylinders for compressed, liquefied and dissolved gases, as well as steam, gas and hot water pipelines used in the construction industry and construction sites. The main technical means of this type of equipment are warnings and devices, the principles of which should be found.

Accidents related to the operation of steam boilers and other pressure vessels cause serious destruction. Not only the persons who serve these vessels, but also the staff near the installation are injured. All this explains increased attention to the issue of safe operation of pressure vessels.

Particular attention should be paid to preventing injuries on testing and operation of pipelines and pressure equipment.

Questions for self -control

1. What equipment belongs to pressure vessels?
2. How are pressure -working vessels classified?
3. How do hydraulic testing of pressure vessels?
4. Why are explosions of cylinders with oxygen and acetylene?
5. What are the rules of service and registration of steam boilers?
6. Safety precautions when operating cylinders.
7. In what colors should the cylinders of oxygen, acetylene be painted?
8. How is oxygen cylinders transported?
9. Safety rules for operating compressor installations.
10. What are the features of operating gas equipment?

Chapter 4. Fundamentals of Fire Safety

Theme 4.1. Basic concepts and components of fire safety

Basic concepts and definitions. The causes of fires, the necessary conditions. Statistics and dynamics of fires and injuries and material damage. Fires as a socially dangerous factor. Components and general scheme of fire safety. Legislative and legal framework of fire safety.

Methodical instructions. Fire prevention is based on the theory of combustion and explosion, which was developed in the thirties of the last century by Soviet academician Semenov H.h. and representatives of his school. The basics of combustion and explosion theory is the scientific base of all work on fire prevention.

Questions for self -control

1. What is fire and fire safety?
2. What conditions and types of combustion do you know?
3. Name the dangerous and harmful factors of fires.
4. What are the main causes of fires in Ukraine?

5. Socio-economic support for fire prevention in Ukraine and human losses related to fires.

6. What are the fire safety systems, their purpose and components?

7. The main components of the flowcharts of the fire safety of the object.

8. What is the legislative and regulatory framework of fire safety?

9. What are the duties of the fire safety employer (owner)?

10. Who carries out state supervision of compliance with current legislation and fire safety standards?

11. The rights and obligations of state fire supervision.

12. Purpose, types and functions of fire protection?

13. Basic requirements for training of employees, population of Ukraine on fire safety.

Theme 4.2. Fire -hazardous properties of substances and materials

The essence of the combustion process. Theoretical foundations of the mechanism of combustion and explosion. Classification of types of combustion. Complete and incomplete burning. Laminar and deflagration, homogeneous and heterogeneous combustion.

Indicators of fire safety of substances and materials. Non -combustible, heavier, combustible materials and substances.

Classification of liquids burning on flammable (LZR) and combustible liquids (GR) by flash temperature.

The classification of aerosols of combustible substances into explosive and fire-hazardous.

Classification of explosive vapor and gas mixtures by the temperature of self -ignition and the ability to transmit detonation through the gaps between the flanges (by Bemshsh - safe experimental maximum slit).

Classification of facilities by fire and explosive danger. Self -ignition, its types, necessary conditions; prone to self -ignition substance; Factors contributing to self -intelligence.

Methodical instructions. Based on the provision that the basics of combustion and explosion theory make up the scientific base of fire prevention, it is necessary to imagine the essence of classifications of different types of combustion and explosion, to imagine the nature of self-ignition of materials, to create classification of objects by fire and explosive danger.

The tasks facing the designers are in the layout of the premises so that in the event of a fire, and even more so the explosion, minimal losses and workers are caused.

Questions for self-control

1. What is burning? Types of combustion at speed of distribution.
2. What kind of fire classes are distinguished by current standards?
3. Classification of materials and substances by a tendency to ignition.
4. Features of dust, liquids, gases, solid materials and substances.
5. What are the main indicators of fire and explosion of substances of different aggregate states?
6. What is flash temperature, ignition, self-ignition for solids, liquids, dust and gas mixtures?
7. What is the lower and upper concentration boundaries of the spread of flames (NCMPP and VKMPP) and the values of these indicators to prevent explosions and fires?
8. How are combustible substances classified by flash, LZR and GR?
9. How do dust-air mixtures are classified by explosive and fire danger?
10. Types of self-ignition of substances and materials, their nature, necessary conditions for self-ignition and prevention of self-ignition?
11. How to classify objects by fire and explosive danger.

Theme 4.3. Assessment of explosive objects

Breastfeeding of building materials. The fire resistance of building structures (stone, reinforced concrete, metal, wooden, as well as structures containing polymeric materials) and their protection against fire.

Determination of the required limits of fire resistance of building structures, buildings and structures.

Fire obstacles, against explosive devices, smoke hatches. Ensuring fire safety at the construction site. Provision of non-visibility of stairwells in high surface buildings. Fire requirements for the development of master plans of construction and internal planning of buildings.

Classification of premises and buildings on fire-hazard. Classes of explosive and fire-hazardous premises and areas in the premises and beyond as factors that determine the requirements for the type of electrical equipment for explosion and danger fire.

Methodical instructions. Guided by the theory of combustion and explosion, as well as the classification of production and technological processes by their explosion* and fire hazard, it is necessary to imagine what conditions the fire resistance of building materials and structures, as well as buildings and structures from the whole, is determined.

The nature of the technological process largely determines the causes of fires.

The issues of fire resistance in the prevention of fires are of paramount importance. When designing buildings and structures, it is necessary to use modern and promising methods of improving the fire resistance of structures. The boundary of fire resistance should be such that it allows in a timely manner - without accidents to evacuate people, and material losses should be minimal.

Questions for self-control

1. How is the duration of a possible fire calculated?
2. Define the standard "Temperature - Time" curve.
3. Why are building structures destroyed by temporary high temperatures?
4. How is the boundary of fire resistance of enclosing building structures calculated?
5. How does the fire resistance of building structures made of steel increase?
6. How does the fire resistance of building structures made of reinforced concrete and bricks increase?
7. How is the fire resistance of building structures made of wood? Antipyrenes, their chemical composition and action.

8. Name the means of increasing the fire resistance of synthetic polymers, artificial resins, plastics. Describe the fire resistance of building structures from these materials.

9. What groups of homes and structures are divided into?

10. How is the fire resistance of building structures made of wood?

11. What is the fire resistance factor? Where is it used?

12. What is the value of critical temperature for building structures made of reinforced concrete, steel, wood, brick, gypsum?

13. How is the category of premises for explosion and fire safety determined?

14. Classes of explosive zones in and beyond.

15. Classes of fire hazardous areas in and beyond.

Theme 4.4. System for ensuring an explosive safety of an object

4.4.1. Bangs and fire prevention system:

- prevention of the formation of combustible environment;
- prevention of formation or introduction into the combustible environment of sparking sources.

4.4.2. Fire Protection System:

- restriction of fire distribution;
- detection of fires (fire alarm);
- extinguishing the fire (water supply, installation of extinguishing fires, etc.);
- protection of people and tangible assets.

4.4.3. System of organizational and technical measures:

- organization of the fire safety service;
- fire safety training;
 - supervision and control over compliance with fire safety legislation.

4.4.4. Providing first aid.

4.4.5. Evacuation of people from homes and structures.

4.4.6. Economic efficiency of fire -fighting measures:

- determination of the economic effect of the use of fire -fighting equipment;

- Determination of fire losses.

Methodical instructions. Fire safety systems are a complex of organizational and technical measures aimed at preventing fire and damages from it, that is, a comprehensive approach to solving the problem is used. According to the current standards, the fire safety of the object must be provided with fire protection systems and a system of organizational and technical measures.

Adverse environmental factors that occur in the case of a fire or explosion, adversely affect employees, and in some cases lead to accidents, injury to people. In a limited time, strong emotional experiences should be determined, quickly and true, which explains the need to have appropriate knowledge and skills. Competent first aid is an indicator of a person's culture, the level of his personality and a declaration.

When solving fire prevention issues, it is necessary to provide methods for safe evacuation of people and tangible assets, limit the spread of fire and create conditions for extinguishing a fire.

In the context of market relations, the economic component determines the possibility of using certain systems for ensuring an explosion safety of an object or enterprise as a whole. Therefore, special attention should be paid to determining the economic efficiency of the measures used.

Questions for self -control

1. The fire prevention system and explosions, its purpose and starting positions.

2. What are the basic measures and means to prevent the formation of an explosive hazardous environment?

3. What are the main measures to prevent occurrence in a combustible environment or to introduce the ignition source into this environment?

4. System of fire -fighting and anti -explosive protection, its purpose and basic components.

5. What technical means are limited to the spread of fire?

6. What is the degree of fire resistance of buildings and structures, and what are the indicators of the degree of fire resistance?
7. What is the boundary of fire resistance of building structures and the limit of propagation of fire?
8. What are the requirements of fire -fighting evacuation outputs?
9. Organizational measures to ensure the evacuation of people in case of fire.
10. Appointment of fire alarm systems and its main elements.
11. What are the main ways of extinguishing fires?
12. Given what factors determine the appropriate ways of extinguishing fires in real production conditions?
13. On what principles are automatic-fire-fighting systems created and operate?
14. What are the main differences between sprinkler and drainage installations of auto-firing fire extinguishers?
15. What extinguishing agents are used in drainage and sprinkler installations?
16. Primary fire extinguishers, their types, principles of action, rules of application.
17. Fire water supply, its use requirements and basic structural elements.
18. What are the basic requirements for maintaining stationary and fire extinguishing?
19. What are the main components of a system of organizational and technical measures to ensure fire safety of objects?
20. What types of fire safety training are envisaged by current standards?
21. What are the principles to be guided when providing first medical aid during a fire?
22. What are the ways of artificial respiration?
23. What is the procedure for restoring cardiac activity?
24. Describe human conditions such as "fainting" and "shock".
25. What are the signs of thermal burns?
26. The order of emergency care for thermal burns.
27. What are the features of skin chemical burns?

Methodical instructions for performing control work

The test work consists of a solution to the tasks and answers to four questions in sections of these guidelines.

Tasks are selected from basic literature [4, 9] on the recommendation of the teacher.

The questions are selected from Table 1 by option, which is determined in accordance with the order number on the list of a group of students.

The solution of tasks and answers to questions should be accompanied by references to literary sources, as well as sketches on a scale made by a pencil in accordance with the rules of technical drawing and drawing. Sketches, magazine clippings, books, etc. are not credited and the work returns to the student. The texts of answers to the questions and solutions of the tasks must be agreed with sketches by digital designations.

At the end of the work, the literature used is indicated.

Table 1

Version	Question
1	2
1	1, 26, 51, 76
2	2, 27, 52, 77
3	3, 28, 53, 78
4	4, 29, 54, 79
5	5, 30, 55, 80
6	6, 31, 56, 81
1	2
7	7, 32, 57, 82
8	8, 33, 58, 83
9	9, 34, 59, 84
10	10, 35, 60, 85
11	11, 36, 61, 86
12	12, 37, 62, 87
13	13, 38, 63, 88
14	14, 39, 64, 89
15	15, 40, 65, 90
16	16, 41, 66, 91
17	17, 42, 67, 92
18	18, 43, 68, 93
19	19, 44, 69, 94
20	20, 45, 70, 95
21	21, 46, 71, 96
22	22, 47, 72, 81
23	23, 48, 73, 91
24	24, 49, 74, 89
25	25, 50, 68, 85

Questions for Control Work

1. What laws belong to the legislative framework for occupational safety?
2. Principles of state policy in the field of labor protection.
3. General provisions of the Law of Ukraine “On Labor Protection”.
4. State, inter -sectoral and sectoral regulations on labor protection.
5. How is labor protection at enterprises and organizations in accordance with Section III of the Law on Labor Protection?
6. What do you know about the collective agreement (agreement)? Who concludes it? What are the provisions entered in the contract?
7. What are the benefits of working women who have not reached the age of 18 years of age.
8. What organizations and institutions carry out state supervision, departmental, public and regional control over labor protection?
9. What is the occupational safety service created?
10. Put the content of the “Model Regulations on the Occupational Safety Service”.
11. What tasks does the labor protection service solve?
12. What are the functions of the labor protection service of regional, city and district state executive bodies?
13. What are the forms of report of occupational safety enterprises and organizations?
14. Types of instruction. In which cases they are conducted.
15. Assessment of the state of labor protection at the enterprise.
16. Benefits and compensation for difficult and harmful working conditions.
17. What is the social and economic importance of labor protection?
18. What is the simplified method of determining the efficiency of labor protection costs?
19. The order of investigation and accounting of industrial accidents.
20. Special accident investigation at the enterprise.

21. Explain the formulas of calculating the rates of accidents and severity of injury.
22. Investigation and accounting of accidents at the enterprise.
23. Methods of study of industrial injuries.
24. Basic measures to prevent injury and occupational diseases.
25. Responsibility for violation of occupational safety requirements.
26. What are the problems of ergonomics science?
27. What is the essence of a person's compatibility problem with a car?
28. Give a classification of the main forms of human activity.
29. What are working and recreation modes for?
30. How is the difficulty and intensity of work determined?
31. What work belong to the moderate category?
32. What parameters determine the meteorological conditions of production facilities?
33. What do you know about a person's thermoregulation?
34. Basic concepts of work physiology.
35. Basic concepts of work hygiene.
36. What measures are used to normalize the microclimate?
37. The effect of harmful substances on the human body. Hygienic normalization of harmful substances.
38. Classification of harmful substances. Features of gas and steam contamination of air.
39. Dust air pollution. Methods for combating harmful substances that enter the air of the work area.
40. The value of light for efficiency and human health. Types of lighting. Units of lighting.
41. Natural lighting, normalization and calculation.
42. Artificial lighting. Its types and calculation?
43. Noise. General concepts and definitions. Hygienic noise normalization.

44. What is vibration? Hygienic normalization of vibration.
45. Protection against noise and vibration.
46. Ultrasound and infrasound, their characteristics and methods of protection.
47. What is the nature and types of ionizing radiation? What is the danger of ionizing radiation?
48. Measures to organize work with radioactive substances and sources of ionization radiation.
49. Normalization of ionizing radiation. Basic parameters and units of measurements.
50. General characteristics of electromagnetic radiation.
51. The effect of electromagnetic radiation on the human body.
52. The action of electromagnetic radiation of the computer.
53. General Provisions for the Protection of PC users.
54. Infrared radiation protection.
55. Ultraviolet radiation protection.
56. Laser radiation protection.
57. What are the main features of laser radiation?
58. Basic definitions and relevance of the electrical safety problem.
59. Factors affecting the severity of electric shock.
60. Classification of premises by the hazard of electric trauma.
61. What is the step voltage?
62. System of technical measures and means of electrical safety.
63. System of electrical safety.
64. System of organizational and technical measures and means of electrical safety.
65. What is the first pre-medical care for electrocution?
66. How does an electric current act on the human body?
67. Possible types of electric trauma and their general characteristics.
68. What are the threshold values of the electric current?

69. How does a protective grounding function and what its efficiency depends on?
70. Why is the essence of electrical installations and what is its scope?
71. What is the principle of protection of houses and structures from lightning?
72. Removal for training and testing of knowledge of electrical staff.
73. Why is the first aid in the case of electric shock?
74. Protection of buildings and structures from atmospheric electricity. The principle of normalization and calculation of lightning protection.
75. What are the types of combustion (chain reactions theory).
76. What is self -ignition temperature and self -ignition temperature. Give examples.
77. What categories are divided into fire hazards?
78. Under what conditions is the possibility of fire excluded?
79. What groups of building materials and structures are divided into?
80. How many degrees of fire resistance are houses and structures divided?
81. Explain the formula for determining the duration of the fire.
82. How is the protection of wooden structures and plastics structures from the action of fire?
83. How is the duration of evacuation of people from public buildings calculated? Explain the examples of evacuation outputs and paths in the building.
84. Explain the fire extinguishing properties of water and the scheme of fire water supply of high and low pressure.
85. Explain the principle of automatic fire extinguishing and electrical fire alarm system.
86. What are the types of fire extinguishing systems? Conditions of their application.
87. What combustible substances can be extinguished with foam and carbon dioxide extinguishers? Explain the structure of these fire extinguishers.
88. What fire extinguishers are equipped with firefighters on construction and how is the fire protection on construction?
89. Classes of explosive and fire hazardous areas in and beyond.

90. What is the lower and upper concentration boundaries of the spread of flames (NKMPP and VKMPP) and the values of these indicators for the prevention of explosions and fires?
91. Describe the action when extinguishing a fire with primary fire extinguishers. What is the liability for violation of fire safety rules?
92. Explain the conditions of the flammable gases and their warning.
93. What are the main differences between sprinkler and drenchery automatic fire extinguishing units?
94. What are the main components of organizational and technical measures to ensure fire safety of objects?
95. What types of fire safety training are envisaged by current standards?
96. What are the main ways of extinguishing fires?

List of recommended literature

Basic

1. The legislation of Ukraine on labor protection: in 3 volumes-K.: Basis, 2008.- Vol.
2. Vakhoneva TM Fundamentals of labor protection in Ukraine./ T.M. Vakhonayeva. - Davor, 2019 - 508 p.
3. Atamanchuk PS Fundamentals of labor protection. /P. Atamanchuk. - K.: Center for Scientific Literature, 2016 - 224p.
4. Occupational safety engineering in the development of diploma projects of engineering and construction specialties. Tutorial. Edited by V.V. Safonova - K.: Basis, 2011. - 480c.
5. Bedriy Ya.I. Fundamentals of labor protection. Educational for students of higher education institutions. Bedria. - Ternopil: Educational Book, 2014 - 240 p.
- 6 Apostolyuk SO, Dzhigire VS, Apostolyuk AS, Sokolovsky IA, Apostolyuk BO Labor Safety: ergonomic and aesthetic foundations: Educ. tool/ S.O. Apostolyuk et al. –K. : Knowledge, 2007. –215s.
7. Zaporozhets O. Fundamentals of labor protection. - Center for Educational Literature, 2020 - 264s.
8. Occupational safety of users of personal computers / Kasyanov MA, Gunchenko OM and others. Tutorial - Kyiv: KNUBA, 2016 –124s.
9. Fundamentals of occupational safety. Methodical recommendations and individual tasks to perform independent work for students of all specialties and forms of study / IV. Klimova, V.T. Kravchuk. - K.: KNUBA, 2021 - 24 p.

Auxiliary

1. DBN A.2.2-1-2003 Design. The composition and content of environmental impact assessment materials (RIA) in the design and construction of enterprises, buildings and structures.
2. DBN A.2.2-3-2012 Design. Composition. The order of development, approval and approval of project documentation of production.
3. DBN A.2.2.3-2014 Design. The composition, procedure for the development, approval and approval of project documentation for construction.
4. DBN A.3.1-5-2016 Management, organization and technology. Organization of construction production.
5. DBN A.3.2-2: 2009 SSBP. Labor protection and industrial safety in construction. Basic provisions.
6. DBN B.1.1-7-2016 Fire protection. Fire safety of construction objects.
7. DBN B.1.2-7-2008 Basic requirements for buildings and structures. Fire safety.
8. DBN B.1.2-10-2008 Basic requirements for buildings and structures. Noise protection.
9. DBN B.1.2-12-2008 SNBB. Construction in conditions of compacted construction. Safety requirements.

10. DBN B.2.2-9: 2018 buildings and structures. Public buildings and structures. Basic provisions.
11. DBN B.2.2-15-2019. Residential buildings. Basic provisions.
12. DBN B.2.2-41: 2019 Highlands. Basic provisions.
13. DBN B.2.5-28–2018 Engineering equipment of buildings and structures. Natural and artificial lighting.
14. DBN 360-92 ** Urban planning. Planning and construction of urban and rural settlements.
15. DSTU 2293–14 labor protection. Terms and definitions of basic concepts.
15. DSTU 4050–2001 Signal clothing. Vests. Specifications.
16. DST-P ONSAS 18001: 2010 System of Occupational and Hygiene Management. Requirements (ONSAS 18001: 2007, IDT).
17. DST B.3.2-3: 2009 Work on the preparation of cement concrete mixes. Safety requirements.
18. DSTU B A.3.2-4: 2009 Work on the preparation of asphalt mixtures. Safety requirements.
19. DSTU B.3.2-5: 2009 Work on the preparation of organic binders with additives. Safety requirements.
20. DSTU B A.3.2-6: 2009 Work on thermal insulation of equipment and pipelines. Safety requirements.
21. DSTU B A.3.2-7: 2009 Painting. Safety requirements.
22. DSTU B A.3.2-8: 2009 Repair of city roads and sidewalks. Safety requirements.
23. DSTU B A.3.2-9: 2009 Repair of city bridges, overpasses and tunnels. Safety requirements.
24. DSTU B A.3.2-10: 2009 Anti-corrosion work. Safety requirements.
25. DSTU B A.3.2-11: 2009 Roof and waterproofing works. Safety requirements.
26. DSTU B A.3.2-12: 2009 Ventilation systems. General requirements.
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рівня вищої освіти усіх спеціальностей

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