Industrial injuries at the enterprise

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Abstract. Labor protection is a system of ensuring the safety of life and health of workers in the process of work, including legal, socio-economic, sanitary and hygienic, psychophysical, treatment and prophylactic, rehabilitation and other measures. The functions of labor protection are the study of sanitation and occupational hygiene, the implementation of measures to reduce the influence of harmful factors on the body of workers in the process of work. The main method of labor protection is the use of safety measures. At the same time, two main tasks are solved: the creation of machines and tools, when working with which the danger to humans is excluded, and the development of special protective equipment that ensures human safety in the labor process, as well as training workers in safe working practices and the use of protective equipment, conditions are created for safe work.

1. Introduction
The organization of the workplace, the design of control and management bodies should take into account the anthropometric, sensorimotor, biomechanical and psychophysiological characteristics of a person. The working posture of a person is of great ergonomic importance. The working position “standing” requires high energy costs and leads to rapid fatigue. The sitting position is less tiring and preferable. The projection of the center of gravity of the human body in the working position should be located within the area of his support.

The space of the workplace in which labor processes are carried out should be divided into work zones. Zoning of the workplace in horizontal and vertical planes. The working area, convenient for the action of both hands, must be combined with the visual viewing area. Minimum work space required to perform work in various body positions.

Otherwise, the position of the human body will be unstable and will require significant muscular efforts. This can lead to diseases of the musculoskeletal system (for example, curvature of the spine), rapid fatigue, and injury. An integral part of the sitting position is the operator's seat. The chair must correspond to the anthropometric data of the person and, if necessary, take into account the amendments for overalls and equipment. The main geometrical parameters of working chairs are standardized. It is advisable to use chairs with adjustable parameters (height, back angle) in order to adapt them to the anthropometric characteristics of a particular person.

Foot and hand controls should correspond to the applied efforts to the biochemical characteristics of a person and, depending on the frequency of their use, should be located in the appropriate reach zones. The efforts on the controls should not be too small so that a person can control the movement
he performs. At the same time, too much effort leads to quick fatigue and muscle strain. For various
types of controls, there are recommendations for the optimal applied forces.

Devices of visual information of the operator, depending on the frequency of their use, should also
be located in the appropriate zones of the human visual field. With frequent use, the instruments
should be located within the optimal viewing angles, with rare use - within the maximum viewing
angles.

The color scheme, the size of the controls must correspond to the psychophysiological and
anthropometric characteristics of a person, the illumination at the workplace and other characteristics
of the light environment.

2. Methods
First aid to the victim in case of an accident is provided immediately at the scene of the accident
before the arrival of the doctor or before the transportation of the victim to the hospital. Every worker
should be able to provide first aid to the victim and help himself ("self-help"). When providing first
aid, you must:

1. to remove the traumatic factor;
2. take the victim out of the scene;
3. to treat damaged areas of the body and stop bleeding;
4. to ensure the immobility of the fracture site, to prevent traumatic shock;
5. take the victim to a hospital.

When providing first aid, you should have the skills to handle the wounded. This is especially
important for fractures, severe bleeding, loss of consciousness, thermal and chemical burns. The
wounded should be lifted and carried carefully, supporting him from below. For first aid, every
production site, every construction site must be equipped with standard first aid equipment.

First aid kit. The first-aid kit includes dressing materials (bandages, cotton wool, individual bags,
adhesive plaster, sterile napkins, hemostatic tourniquet); ammonia (used to stimulate breathing, treat
skin with acid burns, with insect bites); 5% alcohol solution of iodine (for treating wounds); potassium
permanganate (potassium permanganate) - a slightly pink solution is made for gastric lavage, it is also
used to treat wounds; baking soda (for gastric lavage, skin treatment for burns); boric petroleum jelly
(for lubricating napkins when closing penetrating wounds, lubricating the skin); activated carbon (5 ...
10 tablets crush and drink for various poisoning); boric acid (for eye wash, skin treatment);
nitroglycerin (for pain in the heart); analgin, amidopyrine (pain relievers); papaverine (used for pain in
the heart, hypertensive crisis); scissors, a knife, a glass for taking medicine, fingertips, a supply of
drinking water.

First aid for injuries and bruises.
The caregiver should wash their hands with soap, rubbing alcohol, or lubricate their fingers with
iodine. Do not rinse the wound with water, clean it, touch it even with washed hands. If the wound is
dirty, you can only rub the skin around it from the edges of the wound to the periphery with sterile
cotton wool or gauze. Abrasions, injections, minor wounds that do not bleed should be lubricated with
5% iodine tincture or brilliant green and a bandage should be applied.

Small wounds can be sealed with a strip of plaster, BF-6 glue, collodion, which disinfect the wound
and protect it from contamination. In the absence of an individual dressing bag, you can use a clean
handkerchief, having previously moistened it with iodine.

Injuries are accompanied by damage to blood vessels and bleeding, which is internal (most
dangerous) and external. Internal bleeding occurs with penetrating wounds into the abdominal or chest
cavity, with a rupture of internal organs as a result of a strong blow, falling from a height, squeezing,
etc. At the same time, blood accumulates in the internal cavities of the body.
Figure 1. The number of people in the Russian Federation working in hazardous production.

Internal bleeding symptoms; pallor of the face, weakness, rapid pulse, shortness of breath, dizziness, thirst, fainting. It is impossible to stop internal bleeding using first aid methods. The victim should be kept calm and called a doctor. Cold (ice, snow, etc.) should be put in place of the injury.

External bleeding can be:

1. capillary - blood acts as separate drops over the entire surface of the wound;
2. venous - dark red blood flows out in an even stream;
3. arterial - the blood is enriched with scarlet oxygen, flows out in the form of a pulsating stream.

To stop venous bleeding, you can apply a tight bandage below the damaged area or apply a tourniquet, twisting.

The most dangerous arterial bleeding. Arterial bleeding can be stopped by applying a tight bandage above the damaged area or applying a tourniquet, twisting.

For twisting, you can use a scarf, belt, belt, rubber tube, etc. Before applying a tourniquet, the wounded limb is lifted, a tourniquet, a twist is applied over clothing or a piece of cloth is placed under it (Figure 9.3).

Figure: 9.3. Stopping bleeding by twisting: a - tightening the knot; b — twisting with a stick; c - twisting the stick

Tighten the cord only until the bleeding stops. The tourniquet must not be left in a tightened state for more than 2 hours, otherwise the limb may die. During this time, it is necessary to deliver the victim to the nearest medical facility.

Solar and thermal shock.

Signs: at first, severe headache, weakness, rush of blood to the head, tinnitus, nausea, dizziness, thirst, blueness of the face, shortness of breath, pulse 120 .. 140 beats per minute, body temperature rises to 40 °C. The victim's skin is hot and reddened, the pupils are dilated. The victim has convulsions, hallucinations, delirium. The condition quickly deteriorates and he can die within a few hours from respiratory paralysis and cardiac arrest.

First aid: transfer the victim to a cool place, in the shade, take off his clothes and lay him down, slightly raising his head, apply cold compresses to the head and heart area or pour cold water on him. If consciousness is not lost, it is necessary to drink plenty of cold drinks. To excite the victim, give a cotton swab moistened with ammonia to sniff. In case of respiratory failure or cardiac arrest - immediately apply artificial respiration and chest compressions.

Frostbite.

Frostbite occurs mainly when working outdoors during the cold season.

There are four degrees of frostbite. With frostbite of the first degree, paleness and swelling of the skin is observed, its sensitivity decreases. The characteristic signs of the second degree are the
appearance of bubbles with a light liquid. With frostbite of the third degree, skin death occurs, the bubbles are filled with blood fluid; fourth degree - complete necrosis of all small tissues.

First aid: remove clothing and shoes from the victim. Apply a heat-insulating bandage on the affected limb. It should be applied over healthy, intact skin. At the same time, sterile dry napkins are applied to the frostbite area, a thick layer of cotton wool is placed on top of them. After that, the limb is wrapped with oilcloth, tarpaulin or metal foil. Beya bandage is fixed with a bandage. The victim is placed in a warm room, given an abundant hot drink, pain relievers - analgin or amidopyrine. In case of frostbite of the auricles, cheeks, nose, these areas are rubbed with a hand until reddening, then treated with ethyl alcohol. It is inadmissible to rub the frostbitten areas with snow. When using a heat-insulating bandage, it is not removed until a feeling of warmth and tingling appears on the frostbitten areas. The victim is delivered to the nearest hospital.

Freezing. First aid: the victim, after taking off his clothes, is placed in a bath: the water temperature in which should be 36-37 °C, within 15-20 minutes the water temperature is raised to 38-40 °C. Warming in the bath is continued until the body temperature measured in the victim's rectum reaches 35 °C. It is necessary to ensure that the victim does not choke.

If it is not possible to prepare a bath, the victim is washed with warm water, gradually increasing its temperature. After the restoration of normal temperature and consciousness, the victim should be given hot tea, wrapped in a warm blanket and quickly delivered to a hospital.

Electrical trauma.

Local tissue changes in electrical injury are thermal burns of varying severity. General changes develop primarily as a result of damage to the nervous system. These changes in the nervous system determine the picture of the lesion and its severity.

A mild degree of damage is characterized by weakness, fatigue, fright, and sometimes fainting.

The average severity of the lesion is characterized by loss of consciousness of varying duration, pallor or blueness of the skin, convulsions, weakening of breathing and impaired heart activity. Breathing is quickened, superficial, pulse is weak, frequent. Paralysis of the limbs is common.

With severe damage - shock, often a state of clinical death. A general traumatic effect (electric shock) occurs when unacceptable values of current flow through the human body and is characterized by the excitation of living tissues of the body, involuntary contraction of various muscles of the body, heart, lungs, other organs and systems, while their work is disrupted or completely stopped.

When a person is struck by an electric current, it is necessary first of all to free him from the action of the electric current. This can be achieved either by separating the victim from live parts, or by disconnecting the voltage. Separation from live parts is carried out using a dry stick, board, shovel handle, etc. The victim can be pulled by dry clothes. If it is difficult to separate the victim from the live parts, cut the wires with an ax with a dry handle or some object with an insulating handle. You must not touch the victim with your bare hands.

The main condition for the success of first aid is the speed of action, since 5 minutes after the paralysis of the heart, a person cannot be saved. If the victim is at a height, then before disconnecting the voltage, it is necessary to secure the victim's fall.

After eliminating the action of the current, the condition of the victim should be determined. If the victim is conscious, he must be laid down or seated in a comfortable position and, before the arrival of the doctor, ensure complete rest, by all means observing his breathing and pulse.

If the victim is unconscious, but breathes normally and his pulse is felt, he must be comfortably laid down, the collar and belt must be unfastened, a cotton wool moistened with ammonia should be brought to the nose, sprinkled with water and provided complete rest.

Cessation of breathing and cardiac activity are the most severe consequences of electric current. If there is no breathing, but the victim has a pulse, you need to start artificial respiration. If there is no heartbeat, then along with artificial respiration, external (indirect) heart massage should be performed.

When the victim comes to his senses, as well as in case of light injuries, he should be given analgin or amidopyrine, given a large amount of liquid to drink, apply a bandage on the burn area and urgently deliver to a hospital.
Burns.
First aid: take the victim out of the high temperature zone. Quickly extinguish ignited clothing or substances burning on the body, stop air access to the burning area (cover with a dense cloth, cover with earth, sand), pour water over the smoldering clothing. On a victim with extensive burns, pieces of clothing should be cut off and left in place. Do not open bubbles and tear off parts of clothing that have adhered to burns! Do not touch the burned areas with your hands. Cover the burned areas with clean gauze or put a dry cotton-gauze bandage. In case of extensive burns, the victim is wrapped in a clean sheet. You can disinfect the damage by moistening it with cologne.
Wrap the victim in a blanket, give plenty of liquid to drink, give analgin or amidopyrine and immediately transport to a hospital.
Burns arise from exposure to the skin of high temperature (thermal), as well as from exposure to acids and alkalis (chemical), from exposure to electric current (electrical).
Four degrees of burns are distinguished by severity:

I - redness and swelling of the skin;
II - bubbles filled with blood plasma;
III - strings, tissue necrosis;
IV - carbonization of the fabric.

In case of 1st degree burns, the burned area of the skin is washed with alcohol, cologne, vodka or a weak solution of potassium permanganate.
In case of burns of II and III degrees, a sterile bandage should be applied to the affected area of the skin. Do not open the formed bubbles and separate the adhering pieces of clothing. Special care should be taken when releasing clothing from burned areas of the body. In this case, it is recommended to take off clothes and shoes so as not to flay the skin and contaminate the wound.
For eye burns caused by exposure to an electric arc, lotions of a 2% boric acid solution are used.
An area of the skin burned with acid or alkali is washed with a stream of cold water for 12 ... 20 minutes. Then apply a lotion from a soda solution for burns with acid, and for burns with alkali - from a weak solution of vinegar or boric acid (1 teaspoon per 1 glass).

3. Results
In case of poisoning, headache, dizziness, nausea, shortness of breath appear, in severe cases - convulsions and loss of consciousness. If signs of poisoning appear, the victim must be taken out into fresh air, put a cold compress on his head and let the ammonia sniff. If vomiting occurs, the victim must be laid on his side. In case of loss of consciousness, a doctor should be called immediately, and artificial respiration should be given before his arrival.
First aid for chemical poisoning is mainly reduced to removing the poison from the body or neutralizing it before the doctor arrives or before the victim is delivered to a medical institution. If the poison has entered the body through the gastrointestinal tract, it is necessary to give the victim a few glasses of warm water or a weak solution of potassium permanganate, and then induce vomiting. Vomiting is caused by irritation of the back of the throat or by using a solution of table salt (2 tablespoons per glass of warm water). After vomiting, to bind the poison, the victim should be given half a glass of water to drink with two or three tablespoons of activated charcoal, and then a saline laxative.
In case of poisoning with salts of heavy metals and acids, it is recommended to wash the stomach with a solution of magnesium oxide (20 ... 30 g per 1 liter of water). Magnesium oxide forms insoluble compounds with heavy metals and neutralizes acids.
If breathing stops due to poisoning (for example, ether vapor, ammonia), you need to take the victim to fresh air and do artificial respiration.
Poisoning can be acids and alkalis. In this case, acids and alkalis, corroding the mucous membrane of the oral cavity, esophagus and stomach, can cause their perforation.
In case of acid poisoning, the victim is given a solution of baking soda to drink (1-2 tablespoons per glass of water), milk, water. In case of alkali poisoning, the victim is given water with acetic acid, lemon juice, milk. If perforation is suspected (severe pain behind the sternum and in the stomach), the victim is not given anything to drink, and he is urgently taken to the hospital.

Poisoning can also be alcohol, methyl alcohol and alcohol surrogate. First aid for the victim is to rinse the stomach, letting him drink 2-3 glasses of warm water, after which, pressing on the root of the tongue, induce vomiting.

The listed measures are applied regardless of the type of poison that caused the poisoning. If the type of poison is known, additional measures are taken depending on its chemical composition. As a rule, this is the introduction of substances into the stomach that neutralize the effect of the poison. In some cases, 0.04% potassium permanganate solution is used as an antidote.

In case of weakening of breathing or stopping it, immediately apply artificial respiration.

In all cases of suspicion of poisoning with alcohol surrogates, technical fluids, perfumery and cosmetic products, the victims need to be delivered to a medical institution.

If the poison enters the skin, wash the preparation thoroughly with a stream of water, preferably with soap, or, without smearing it on the skin or rubbing it, remove it with a piece of gauze (cloth, cotton wool), and then wash it with cold water or a slightly alkaline solution (1 teaspoon of drinking soda in a glass of water). If the poison gets into the eyes, rinse them thoroughly with water or 2% baking soda solution.

To protect hands from exposure to chemicals, rubber, and in some cases woolen or synthetic gloves, as well as special pastes (ointments) are used.

Galvanostipists, photographers, copiers, etchers, printers, receptionists on offset machines and other workers in contact with chemical solutions must work in rubber acid and alkali-resistant seamless gloves or acid-proof cotton gloves with a special coating. To preserve the protective properties of gloves and mittens, do not put them on contaminated hands, do not allow oil, acid solutions, etc. to get into them.

In workshops where large quantities of acid and alkali are used (electroplating, pickling), rubber boots should be worn.

Respiratory organs protect against harmful gases, vapors and dust using special filtering and isolating devices.

4. Discussion
Filtering devices are divided into gas masks, designed to protect against poisonous gases and vapors, and respirators, which protect the respiratory system from dust and smoke.

Respirators are available with or without valves. The valves are used to separate the inhaled and exhaled air. Respirators, designed to protect not only the respiratory system, but also the head, neck, face from substances irritating the skin, have the form of a hood or helmet, to which filters from different materials are attached - felt, cotton wool, special cardboard, paper, etc. P.

Respiratory protection equipment is selected in accordance with GOST 12.4.034-2001 SSBT "Filtering personal respiratory protection equipment, General technical requirements" depending on the type of harmful substances, their concentration and the required protection factor.

When working with caustic substances, the skin of the face, neck and hands is protected with special ointments, pastes, which are applied to the skin before starting work, and then washed off. Pastes and ointments are divided into hydrophilic and hydrophobic. Hydrophilic - readily soluble in water. They protect the skin from fats, oils, oil products. Hydrophobic pastes do not dissolve in water. They are used to protect the skin from solutions of various acids, alkalis and salts.

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