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**CREATION OF RECOMMENDATIONS FOR ENSURING THE
SAFETY OF TECHNOLOGICAL FORCES IN PRODUCTION
ENTERPRISES**

Annotation: Requirements for the safety of production equipment and production processes are established in the system of occupational safety standards as well as in building codes and regulations. In this article highlights of creation of recommendations for ensuring the safety of technological forces in production enterprises.

Key words: safety, recommendation, technological forces, production enterprises, operation.

The reliability (probability of disruption of normal operation) of the equipment is ensured by the choice of durable structural elements, safe parameters of work processes and design solutions, as well as the use of control and measuring devices, regulators, automation and means of protecting people. In order to ensure human safety, reliability and ease of operation of production equipment, it is necessary:

- to ensure the safety of workers during installation, commissioning and operation of equipment (both in the case of its autonomous use, and as part of technological complexes);

- use controls and display of information that meet requirements and are located in such a way as not to cause increased fatigue and negative psychological impact;

- use an equipment management system that ensures its reliable and safe operation in all operating modes and under all external influences in the operating conditions of the equipment. General safety requirements" it is established that

safety is ensured by: choosing safer equipment; the use of protective equipment, mechanization, automation and remote control in the design; compliance with ergonomic requirements. The equipment must be safe both under normal conditions and under the influence of various environmental factors (high and low temperatures and humidity, aggressive substances, microorganisms, fungi, solar radiation, etc.). General safety requirements and is provided by: safety of production equipment; choosing a safer technological process; elimination of direct contact of workers with raw materials, blanks, semi-finished products, finished products and production waste that have a harmful effect; selection of the production site and production facilities; the use of protective equipment for workers; professional selection, instruction, training and testing of knowledge on labor protection.

Safety should be ensured already at the stages of drawing up the terms of reference, during the design and development of the project.

It is necessary to ensure the sealing of equipment, the use of remote control, monitoring systems and warning alarms in case of dangerous situations.

Production processes must be fire - and explosion-proof, must not pollute the environment. If necessary, additional requirements are imposed on the staff: by age; medical examination; training, etc.

The fulfillment of these requirements in full is possible only if they are taken into account at the design stage. Therefore, our country has adopted an appropriate procedure for putting products into production, according to which safety requirements should be provided for in all types of project documentation. They are contained in a special section of the terms of reference, technical specifications and standards for manufactured equipment.

At the design stage, all these devices and assemblies are calculated for strength, taking into account their rigidity and the type of acting loads (static, dynamic). At the same time, the right choice of safety margin plays an important role. Its values depend on the operating conditions, the presence of fatigue stresses during the operation of machines and a number of other factors.

The choice of structural materials of machines and mechanisms is also made taking into account potentially possible dangerous and harmful factors. Sparking materials should not be used in equipment for production facilities where the formation of explosive environments is possible. Conventional structural materials should not be used in pressure-operated installations, on aggressive working bodies or in conditions of particularly low temperatures. The choice of fire-hazardous materials as structural materials (for example, magnesium) creates large difficulties at the stage of both operation and manufacture of equipment.

The general requirements for protective equipment are: exclusion of the likelihood of exposure to hazardous and reducing the impact of harmful production factors on workers, taking into account the individual characteristics of equipment, tools, devices or technological processes for which they are intended; reliability, durability, ease of maintenance of machines and mechanisms in general, including protective equipment. Let's look at certain types of protective equipment in more detail. The design and material of the enclosing devices are determined by the features of the equipment and the technological process as a whole. Fences are made in the form of welded and cast casings, gratings, grids on a rigid frame, as well as in the form of rigid solid shields (shields, screens).

Metals, plastics, and wood are used as the fencing material. If it is necessary to monitor the working area, in addition to grids and grids, solid protective devices made of transparent materials (plexiglass, triplex, etc.) are used.

The calculation of fences of the type of screens designed to protect against thermal, electromagnetic, ionizing radiation, as well as from sound and ultrasonic vibrations, is carried out according to special methods. The basis of the calculation is to ensure the attenuation of radiation to the limits permissible by the relevant sanitary standards. According to the principle of operation, locking devices are divided into mechanical, electronic, electrical, electromagnetic, pneumatic, hydraulic, optical, magnetic and combined.

Optical blocking is based on the principle of fencing a dangerous area with light rays. The luminous flux incident on the photocell (photosensitivity) is

converted into an electrical signal, which, after amplification (if required), is fed to the measuring and command device. Electronic (radiation) blocking is used to protect hazardous areas on presses, guillotine shears and other types of technological equipment used in mechanical engineering. The pneumatic locking system is widely used in units where working bodies are under high pressure: turbines, compressors, blowers, etc.

Examples of restrictive devices are elements of mechanisms and machines designed for destruction (or failure) during overloads. Weak links of such devices include: shear pins and dowels connecting the shaft with a flywheel, gear or pulley; friction clutches that do not transmit motion at high torques; fuses in electrical installations; rupture membranes in installations with high pressure, etc.

Weak links are divided into two main groups: links with automatic restoration of the kinematic chain after the controlled parameter has returned to normal (for example, friction clutches), and links with restoration of the kinematic chain by replacing the weak link (for example, pins and dowels). The operation of a weak link leads to a stop of the machine in emergency modes, which makes it possible to exclude breakdowns, destruction and, consequently, injuries. The safety of production processes is achieved by a set of measures and means of design and organized solutions:

- * adoption of the most advanced modern technologies;
- * selection of production equipment and its placement, taking into account the norms and rules of safe operation;
- * selection and provision of production areas, equipment and placement of buildings and structures taking into account the requirements of industrial sanitation, occupational health and safety;
- * professional selection and training of employees at the enterprise;
- * organization of production processes taking into account the technical capabilities of the equipment and the ergonomic capabilities of a person;
- * the use of collective and individual protection of workers from hazards and negative factors;

* constant supervision and control over the implementation of safety, industrial sanitation and occupational health requirements.

With all the variety of technological processes, there are general measures, requirements, the fulfillment of which allows you to create safe working conditions

* the use of remote control, complex mechanization and automation of production processes;

* exclusion of direct contact of workers with harmful substances, negative factors;

* ensuring the sealing of technological equipment;

* application of process safety control systems;

* application of means of blocking and automatic shutdown of technological equipment;

* the use of rational work and rest regimes in order to prevent negative effects, prevent the effects of dangerous and harmful production factors (the effects of noise and vibration, the accumulation of harmful substances and radionuclides in the body, psychophysiological effects, etc.).

* ensuring electrical safety when working with electrical appliances and equipment;

* ensuring explosion and fire safety, etc.

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