

METHODS OF FIRE PROTECTION IN A PARTICULAR FIRE ZONE

Ruzimuradov Otabek Tursunovich

Karshi State University

ABSTRACT

In this article, the zone of separate fires and fire protection methods are fully described in them, the development and implementation of measures aimed at eliminating the causes of possible fire limiting the spread of fires and creating conditions for the successful evacuation of people and property in the event of a fire, timely detection of fire, prompt calling of the fire department and successful extinguishing of the fire the ways of providing are indicated.

Keywords: area, separate, fire, zone, evacuation, protection

INTRODUCTION

Zone of separate fires - in these areas, fires occur in separate areas, separate zones and production facilities. Such fires are spread over the entire territory, which makes it possible to quickly organize their mass extinction, involving all available forces and means.

Zone of mass and continuous fires - where there are such a large number of fires and fires that it is impossible for the relevant units to pass and be without localizing or extinguishing measures, and difficult rescue area.

Such zones appear in conditions of continuous development, compact forests and accumulation of large amounts of combustible materials.

A type of continuous fire is a fire storm (tornado) - a particularly strong fire in the zone of continuous fires, in the center of which a rising convection column appears in the form of a fiery vortex column, reaching a height of up to 5 stretched. km. Strong wind currents are directed towards it from the edge of the fire zone. The temperature rises to 1000 ° C. It's almost impossible to put out a firestorm before everything burns. The conditions for the occurrence of a fire storm are the following: the presence of buildings or the spread of a certain amount of combustible material in the relevant area, low relative humidity (less than 30%).

Flare fires and debris burning zones are characterized by heavy smoke and prolonged (more than two days) burning in the debris.

The actions of the relevant departments are limited to the threat to human life due to the release of heat radiation and toxic combustion products.

If the visibility does not exceed 10 m, it is considered hazardous smoke.

Fire protection is a set of measures and technologies designed for fire protection, that is, to reduce or completely eliminate the possibility of burning or fire damage to buildings built as a result of combustible materials and their use. to do

Fire prevention methods are divided into those that reduce the likelihood of fire (prophylactic, passive) and direct protection and rescue of people from fire (active).

Preventive methods. For fire protection, special liquids are used that impregnate wood and fabrics, heat-resistant paints, plasters, etc. The action of fire-resistant compounds is based on the isolation of the protected object from the effects of high temperatures. Usually, such measures do not prevent fire in fire conditions, but increase the fire resistance of protected

materials. Even the use of steel load-bearing structures does not prevent fire damage in conditions of prolonged exposure to high temperatures.

Electrical wiring is insulated to prevent short circuits that could cause a fire. Wires and cables must be laid only on non-combustible substrates. Install RCD and automatic fuses. Thermal insulation of gas and electric stoves from wooden furniture. Insulate the sockets located in bathrooms and external walls from moisture. Ashtrays are used to extinguish cigarette residues, candles are lit in candlesticks.

Active protection methods. Mobile fire brigades are being created for quick response.

Direct fire protection is divided into human protection from high temperatures and dangerous fire factors, which are often more dangerous, one of which is carbon monoxide. They use thermal insulating clothing BOP (Firemen's Combat Clothing), insulating gas masks and compressed air devices and air-filtering hoods similar to gas masks.

The most important means of protecting people from fire hazards is building planning decisions. Escape routes should be lit through openings in the outer enclosure. The windows in these openings should be made of easily removable materials. In stairs without natural light, air must be supplied to the stairs. In the case of long corridors without natural light, it is necessary to arrange for the removal of smoke from escape routes. Smoke extraction and air pressure shut-off systems must be activated by the fire alarm system.

Active fire extinguishing (fire extinguishing) is carried out with fire extinguishers of various fillings, sand and other non-combustible materials that prevent the spread and burning of fire. If the building is equipped with an automatic fire extinguishing system, it must be used to extinguish the fire.

In addition, sometimes the fire is hit by a shock wave. This method is used to extinguish forest fires. A combined shock wave changes the direction of fire propagation.

For self-evacuation of people from burning areas, a winch attached to the outside of the window is used, through which people living on high floors can descend to the ground. Fireproof safes are used to protect valuables and documents from fire.

The fire alarm system is the creation, collection, processing, registration and transmission of fire alarms, system operation modes, and other information in a certain form. and a set of technical tools designed to issue signals to control technical fire protection when necessary. equipment, technological, electrical and other equipment.

Fire alarm system consists of control panel, detectors, sirens, connecting lines and actuators.

Types of fire alarm systems:

- radial;
- addressable (the decision is made directly by the installed fire detectors themselves, and then the signal signal is transmitted to the receiving and control equipment. And based on this signal from the detector, fire o 'rotation system is enabled);
- addressable analog (the value of the parameter controlled by the detector (temperature in the room, amount of smoke) is transmitted to the receiving and control equipment. The main equipment constantly monitors the environmental conditions in all rooms of the building and controls their condition. changes in the indicated parameters dynamics and based on this information, it decides to generate not only the "Fire" signal, but also the "Warning" signal).

Methods and means of extinguishing fire. In order to stop the burning, the following is necessary: preventing the oxidizing agent (air oxygen), as well as combustible substances from entering the burning zone; cooling this zone below the ignition temperature (automatic ignition); dilution of flammable substances with non-combustible substances; intensively slowing down the rate of chemical reactions in fire (inhibition); mechanically tearing (tearing) the flame.

Certain methods and methods of extinguishing fire are based on these fundamental methods. Fire extinguishing agents include: water, chemical and air-mechanical foams, aqueous solutions of salts, inert and non-flammable gases, water vapor, halochlorid fire extinguishing mixtures and dry fire extinguishing decay powders.

Water is the most common and available fire extinguisher. After entering the combustion zone, it heats up and vaporizes, absorbing a large amount of heat, which helps to cool the combustible material. When it evaporates, steam is formed (from 1 liter of water - more than 1700 liters of steam), which limits the entry of air into the combustion chamber. Water is used to extinguish solid combustible substances and materials, heavy petroleum products, as well as to create water curtains and cool objects located near the fire. A fine spray of water extinguishes even flammable liquids. To remove poorly wetted substances (cotton, peat), substances that reduce surface tension are added to it.

There are two types of foam: chemical and air-mechanical.

Chemical foam is formed by the interaction of alkaline and acidic solutions in the presence of foaming agents.

Air-mechanical foam is a mixture of air (90%), water (9.7%) and foam (0.3%). Spreading on the surface of the burning liquid, it blocks the source and stops access to air oxygen. Foam can also be used to extinguish solid flammable materials.

Inert and non-combustible gases (carbon dioxide, nitrogen, water vapor) reduce the concentration of oxygen in the combustion zone. They can extinguish any fire, including electrical installations. The exception is carbon dioxide, which cannot be used to quench alkali metals because it causes a reduction reaction.

Fire retardants are aqueous solutions of salts. Solutions of sodium bicarbonate, calcium and ammonium chlorides, Glauber's salt, etc. are widely used. Precipitated salts form an insulating film on the surface.

Halocarbon fire retardants help inhibit combustion reactions. These include: tetrafluoromethane (freon 114B2), methylene bromide, trifluorobromomethane (freon 13B1), etc. These compositions have a high density, which increases their efficiency, and their low freezing point allows them to be used at low temperatures. They can extinguish any fire, including live electrical installations.

Fire extinguishing powders are finely dispersed mineral salts with various additives that prevent them from caking and accumulating. Their fire extinguishing ability is several times higher than that of halocarbons. They are universal because they suppress the burning of metals that cannot be extinguished by water. Powders include: sodium bicarbonate, diammonium phosphate, amphos, silica gel, etc.

All types of fire fighting equipment are divided into the following groups:

- fire engines (vehicles and motor pumps);

- fire extinguishers;
- fire fighting means;
- fire alarm systems;
- fire rescue devices;
- firefighter's hand tools;
- fire fighting equipment.

Each industrial enterprise must be equipped with a certain number of certain types of fire-fighting equipment in accordance with federal and departmental standards.

Primary fire extinguishers are used to extinguish small fires. These include: fire nozzles working from an internal fire pipe, fire extinguishers, dry sand, asbestos sheets, etc.

Locations of fire fighting equipment must be marked with signs. Access to fire extinguishers and other fire fighting equipment should be convenient and unobstructed.

In the production of categories A, B, B and E, stationary fire extinguishers are used, with all elements installed and always ready for operation. They can be automatic or remote (controlled by people).

Enterprises also use stationary fire extinguishing devices - steam, air-foam, aerosol and powder.

Fire extinguishers are designed to extinguish fire in the initial stages of development. They are divided into air foam, chemical foam, liquid, carbon dioxide, aerosol and powder. The most common chemical foam fire extinguishers are OHP-10, OP-M and OP-9MM.

To extinguish various substances (except alkaline and alkaline earth metals) and electrical installations up to 10 kV, the industry produces OU-2, OU-5, OU-8, OU-25, OU-80 and carbon dioxide fire extinguishers. emits OU-400. Carbon dioxide in fire extinguisher cylinders is under a pressure of 6-15 MPa.

Fire prevention is a set of engineering, technical and organizational measures aimed at ensuring fire protection of economic objects.

The purpose of fire prevention works is to ensure a high level of fire safety by bringing fire safety to an exemplary state in cities, settlements, places of accumulation of wealth and economic facilities in the country.

The main tasks of preventive work are as follows: development and implementation of measures aimed at eliminating the causes that may lead to fire; limiting the spread of possible fires and creating conditions for the successful evacuation of people and property in the event of a fire; timely detection of fire, prompt calling of the fire department and ensuring successful extinguishing of the fire.

Preventive works at the facilities include: periodic inspection of the fire safety condition of the facility as a whole and its separate sections, as well as ensuring control over the timely implementation of the proposed measures; Conducting a fire-technical inspection of the object with the delivery of instructions by the representatives of the State Fire Control (Gospozhnadzor), establishing effective control over the execution of the instructions and orders given on them; constant monitoring of fire-hazardous work and compliance with fire safety requirements in new construction facilities, workshops, constructions, workshops, warehouses and other buildings during reconstruction and re-equipment; interviews, briefings and special trainings on fire safety issues with the workers and employees of the facility (as

well as with temporary workers of other enterprises and organizations who come to the facility) and fire safety promotion and campaigning conducting other activities on; checking the serviceability and correct operation of stationary automatic and primary fire extinguishing equipment, fire water supply and fire reporting systems; training the personnel of voluntary fire brigades and combat brigades to carry out preventive work and to extinguish fires and fires; installation in workshops, workshops, warehouses and separate blocks of automatic fire protection systems.

Fire prevention works in enterprises State Fire Inspectorate, employees of fire departments, fire-technical commissions (PTK), voluntary fire brigades (VFD), voluntary fire societies (VFS), security departments, as well as independent fire inspectors. .

The main method of preventive work is to eliminate the defects found during the inspection on the spot, if this is not possible, as soon as possible. Activities such as equipping shops, workshops, warehouses with automatic fire-fighting equipment, replacing combustible materials with less flammable materials, etc., are formalized by instructions or acts submitted to enterprise managers.

State fire control bodies are obliged to monitor compliance with applicable fire safety rules and standards in the design, construction, reconstruction and use of buildings and structures.

The main form of fire safety work of state fire control bodies in economic facilities, including household service enterprises, is carried out in order to control compliance with the rules and regulations approved in the prescribed manner aimed at fire prevention. fire-technical inspections (FTE). , their successful extinguishing, ensuring the safety of people in the event of a fire, as well as providing buildings and structures with fire fighting equipment.

About 60% of fires in industrial enterprises occur as a result of negligence of workers or gross violation of fire safety rules. Often, this includes smoking in the wrong places, leaving electric heaters unattended, using torches and torches to heat frozen pipes, tractor and car engines in winter.

To eliminate these causes of fires, it is necessary to establish a strict fire safety regime, to train workers and employees in fire safety rules.

Fire safety regime is a set of requirements in the nature of fire safety measures and regime, which are established in advance for an enterprise or individual buildings and must be followed by all workers and employees. The fire safety regime includes preventive measures such as installation of smoking areas, daily cleaning of buildings from dust and combustible waste, inspection and closing of buildings after completion of work, installation of circuit breakers (switches) to de-energize electrical installations. takes availability of passages and escape routes, etc.

Usually, fire safety measures do not require large material costs and can be carried out independently by the administration and technical staff of any workshop, workshop, warehouse or laboratory.

All workers in enterprises must undergo special fire safety training in the industrial education system to learn:

- instructions on fire safety rules and fire safety measures;
- fire hazard indicators of substances and materials stored, used and circulated in production;

- fire hazard characteristics of buildings, structures, technological processes and production equipment;
- rules for storage and use of primary fire extinguishers;
- sequence of actions in case of fire.

Fire safety training (training) of enterprise employees consists of fire safety briefings (introductory, initial, repeated and unplanned) and training in accordance with the minimum fire-technical program. The procedure for conducting fire safety briefings and training for workers and employees on fire safety standards is determined by the relevant order or regulation. It is recommended to use the technical means of programmed training when conducting fire safety briefings and classes on fire technical minimum.

Instructions are carried out taking into account the characteristics of each workplace, workshop, installation, warehouse, as well as the training of those instructed and the nature of the work they perform. During on-the-job training, they learn the following: the fire risk of a specific workshop, section and technological process of the workplace, the fire safety regime in the workshop, possible causes of fire and measures to eliminate them.

During the fire safety briefing, workers and employees are informed about the applicable fire safety rules and guidelines at the enterprise, the possible causes of fires and their prevention measures, and the areas where the risk of fire is the most dangerous. should be familiar with the release areas as well as practical training. actions in the event of a fire (calling the fire department or squads, using fire extinguishers, stopping technological equipment, evacuation of material resources). The briefing should be accompanied by a demonstration of the fire fighting equipment and fire communication facilities available at the facility.

Workers and attendants should be trained in the proper use of fire extinguishers, internal fire hydrants, and the operation of stationary pumps.

Correct operation of electrical networks and devices is important in fire safety. In operational conditions, the electrical network must meet fire safety requirements. When installing it, special breakers and fuses are installed to protect the insulation from overloading and burning. When using an electrical network, you cannot use "faults" instead of calibrated fuse contacts or protective devices, because this will lead to overloading of the line, drying of the insulation, short circuit and fire.

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