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Analysis of the Organization and Conduct of Emergency Rescue Activities

A. Sh. Ibrayeva, B.S. Turdaliyeva and G.Ye. Aimbetova
Department of Health Policy and Management, Kazakh National Medical University named after S.D. Asfendiyarov, Almaty, Republic of Kazakhstan

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Corresponding Author:
A. Sh. Ibrayeva
Department of Health Policy and Management, Kazakh National Medical University named after S.D. Asfendiyarov, Almaty, Republic of Kazakhstan

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Abstract: Elimination of emergency situations is emergency rescue and other urgent work carried out in the event of emergencies and aimed at saving lives and preserving people's health, reducing the extent of damage to the environment and material losses as well as the elimination of zones of emergencies, the termination of the characteristic factors for them. Carrying out emergency rescue and other urgent work is one of the main tasks. Rescue and rescue operations are actions to save people, material and cultural values, protect the natural environment in emergency zones, localize emergency situations and suppress or bring to a minimum possible level of exposure to the characteristic hazardous factors. Emergency rescue operations are characterized by the existence of conditions that threaten the life and health of people carrying out these works and require special training, equipment and equipment.

INTRODUCTION

Contents of rescue operations: Conducting reconnaissance of routes for the nomination of units and sections (objects) of work. Localization and extinguishing of fires on the sites (objects) of works and ways of nominating to them. Search for the stricken, extracting them from damaged and burning buildings, blockages, gassed, flooded and smoky rooms. The opening of destroyed, damaged and littered protective structures and the salvation of people in them. Supply of air to the flooded protective structures. Providing first aid to the victims and evacuating them to medical institutions. Withdrawal (removal) of the population to safe areas[1].

Sanitary treatment of people and disinfection of their clothing, territory, structures, equipment, food and water. The basis for the organization of rescue operations should be a differentiated approach[2].

Other urgent work is the activity on comprehensive provision of emergency rescue operations, providing medical and other types of assistance to the population affected by emergencies, creating the conditions that are minimally necessary to preserve the life and health of people and to maintain their efficiency[3].

The objectives of other urgent work:

- Creation of conditions for rescue operations
- Prevention of further destruction and losses caused by secondary damaging factors
- Provision of vital activity of the affected population and objects of the economy in emergency situations.
- Contents of other urgent work
- The laying of column tracks and the arrangement of passages (passages) in obstructions and contamination zones
- Localization of accidents on gas, power, water, sewage and technological networks

- Strengthening and collapse of structures of buildings and structures that threaten to collapse and impede the safe conduct of rescue operations
- Repair and restoration of damaged communication lines and utilities
- Detection, decontamination and destruction of explosive objects
- Repair and restoration of damaged protective structures

In real conditions it is difficult to separate emergency rescue operations from other urgent work and for a significant part of the work the difference is purely conditional. Therefore, in the practice of rescue and rescue, the general term emergency rescue and other urgent work (EROUW) was fixed[4].

The scope and conditions of the EROUW in many ways depend on the extent of the ES and in wartime the type of weapons used and the scale of military operations. The most difficult conditions for conducting EROUW can occur in the focus of a combined lesion. Depending on the scope of work, various forces and means are mobilized in order to eliminate the consequences of the disaster, in such a quantity that they ensure the continuity of the EROUW. Continuity of work is achieved by timely build-up of efforts, skillful maneuver by forces and means, timely replacement of units, full provision of materials, means, quick repair and the return of damaged equipment.

The success of emergency response, emergency rescue and other urgent work is achieved: in advance and purposeful preparation of the management bodies, forces and means of the Emergency Council for actions in case of a threat and emergence of an emergency situation.

Emergency response of the Emergency Situations Department to the emergence of an emergency situation, the organization of effective reconnaissance, the alerting of command and control agencies, forces and means, their timely deployment to the emergency zone, the deployment of control systems, the necessary forces and equipment.

The adoption of an informed decision to eliminate the emergency situation and the consistent implementation of it. Continuous, solid and sustainable management of the work (their planning, coordination and control) and close interaction of the participants in the course of the work[5].

Continuous management of emergency rescue and other urgent work day and night, in any weather until their complete completion, with the involvement of methods and technologies that ensure the fullest use of the capabilities of rescue units.

Unswerving fulfillment of the established work regimes and security measures by the participants of the work, timely change of formations in order to restore their efficiency.

The organization of uninterrupted and comprehensive material support of works, life support of the population and participants of works, rendering them psychological assistance. High training and moral and psychological training of personnel.

Advance preparation for the elimination of possible emergencies is organized and conducted by federal executive bodies, executive authorities of the subjects, local governments and organizations in accordance with their authority[6].

The main measures ensuring the creation of effective prerequisites for successful liquidation, in the following, emergency situations are:

- Training of officials, management bodies, formations and the population to act in emergency situations
- Creation of groupings of forces aimed at protected areas
- Carrying out the necessary technical equipment for the management bodies and forces of the emergency service
- Maintaining the readiness of command and control agencies, forces and assets
- Creation of a reserve of material resources for the liquidation of emergency situations
- Planning of possible actions for liquidation of emergency situations
- Organization of interaction between subsystems and emergency links
- Realization of the constant control over the situation in the country connected with emergency situations

The liquidation of an emergency situation depends critically on the organization of the actions of the command and control agencies and emergency forces. The organization of the EROUW is based on the plans of actions for the prevention and liquidation of emergency situations that are developed at all levels of the RPSS in all its subsystems and links in advance. These plans are developed on the basis of an assessment of the risk of an emergency situation for the relevant territory or facility, forecasting the options possible in this situation, analyzing possible solutions for work[7].

In the plans of actions for the prevention and elimination of emergencies civil defense it is envisaged to create a grouping of forces and means intended for carrying out EROUW during the liquidation of the consequences of emergency situations and in conducting military operations. The composition and construction of the group is clarified in the event of a threat of an enemy attack or the emergence of emergencies and after their emergence, taking into account the prevailing situation, the real availability and condition of personnel and equipment and the scope of work in the lesions[8].

To ensure continuous work, the grouping of forces consists of the formations of the first echelon, the second

echelon and the reserve. The first echelon of the grouping of forces and assets is intended for conducting emergency rescue operations (readiness for up to 0.5 h).

The second echelon is to increase efforts and expand the front of rescue operations as well as to protect the units of the first echelon (readiness of up to 3 h). Reserve to solve sudden problems, increase efforts, replace parts of the first (second) level, transfer efforts to new sites (objects) of work (readiness for >3 h).

The formations that make up the echelons are distributed by shifts with the integrity of their organizational structure and production principle. The composition of the echelons and shifts is determined on the basis of the specific situation in the locus of defeat, the availability of forces and means[9].

The sequence of the EROUW in the emergency zone (in the affected areas) largely depends on the nature of the situation and is determined by the chairman of the Commission for Emergency Situations and Fire Safety (CFS) and the head of civil defense. Analysis of the implementation of EROUW in the response to emergencies and civil defense shows that all tasks are carried out in stages in a certain sequence and in the shortest possible time.

At the first stage, the tasks of urgent protection of the personnel of the facilities and population, the prevention of development and the reduction of the impact of the damaging factors of the sources of accidents (catastrophes) and the preparation for the implementation (implementation) of EROUW are being accomplished. First of all, the personnel of the facility and the population are notified of emergencies.

At the second stage, the main task is the direct implementation of EROUW. At the same time, the tasks of the first stage continue. In the first order, work is carried out on the arrangement of driveways and passages in the dams to protective structures, damaged and destroyed buildings and structures where the victims may be located, to the places of accidents that impede or impede the conduct of the EROUW.

At the third stage, tasks are being fulfilled to ensure the vital activity of the population in the areas affected by the accident (disaster) and to restore the functioning of the facility. Measures are being taken to restore housing (or erect temporary residential buildings), energy, water, communications, medical care, food and basic necessities. And with radiation contamination, chemical and bacteriological contamination of the area, decontamination, degassing and disinfection are carried out (if this was not done at the 2nd stage)[10].

Upon completion of these works, the evacuated production personnel and the population are returned. Let's consider the actions of the formations of the Emergency Situations and Civil Defense Forces in the second stage of the task fulfillment, since, at that time the main emergency rescue and other urgent work is being carried out.

So, in the first order, works are carried out on the arrangement of driveways and passages in the obstructions to the protective structures and places of accidents. Passage (passage) with local insignificant obstructions is arranged by clearing the roadway from the debris and in case of difficult obstructions with a height of >1 m laying the passage through the blockage.

Passages are arranged with a width of 3-3.5 m for one-sided and 6-6.5 m for two-way traffic. With one-way traffic, 15-20 m routs are made every 150-200 m. Formations of mechanization using autocranes and bulldozers are used for the device of passages (passages). Simultaneously with the work on the installation of the passages (passes), reconnaissance of the work areas is carried out, methods and methods for saving people from blockages and protective structures, localizing fires, suspending and limiting the release (leakage) of AHOV are determined. At the same time, localization and liquidation of accidents can be carried out on technological production lines and capacities with AHOV, utilities and technology networks which threaten people's lives and prevent the implementation of EROUW (if this was not done in the first stage)[11].

After the completion of works on the arrangement of passageways (passages) for the formation of mechanization in conjunction with emergency technical and rescue units and in case of fires at sites and with fire-fighting teams, they are moved to the work sites and begin to search for and rescue people, open the flooded protective structures, feed them air, if necessary and to conduct other works.

The company's gas rescue unit works in gassed buildings and structures. Firstly, the gas pipeline is closed, causes of gas leakage are established and their elimination is carried out, all premises are ventilated in order to prevent explosions and fires.

One of the main tasks of EROUW which is solved in the initial stage of the development of a chemical accident, is the suspension or restriction of the release (leakage) of Accidentally chemically hazardous substances (AChHS).

This task is accomplished by shutting off the cranes and latches on the mains and tanks as well as by using bandages, clamps, tampons, plugs and pumping liquid from the emergency capacity to the reserve tank[12].

To localize chemical contamination, prevent spreading of AChHS, prevent strong contamination of soil and groundwater, various simple methods and means can be used:

- Dumping of the spillage
- Creating obstacles to the spread of AChHS (dams, lintels, etc.)
- Collection of AChHS into natural depressions, traps (pits, ditches, cuvettes)

To reduce the rate of evaporation of AChHS and to limit the depth of propagation of their vapor-gas phase, the following methods can be used:

Dissipation (absorption) of the AChHS vapor-gas phase by means of water (steam) curtains. To neutralize AChHS in water, various neutralizing agents can be added. Absorption of the liquid phase by a layer of loose absorbent materials (soil, sand, slag, coal or its dust, expanded clay, sawdust, etc.). Isolation of the liquid phase by foams, film material, decking, etc.,

Degassing of AChHS by solutions of reactive chemicals. In case of major accidents (destruction) at chemically hazardous facilities, it may be necessary to attract mobile forces of civil defense and emergency forces, engineer troops and troops as:

Cordon of the hearth of defeat, conducting complex reconnaissance; emergency delivery and delivery of protection to the population in a potentially dangerous zone assistance in evacuation (resettlement) of the population and the removal of livestock, the deployment of the commandant's service in the area of the accident, degassing (neutralizing) the AChHS at the site of the spill (ejection).

Degassing of terrain, equipment, machinery, industrial buildings, collection, removal of contaminated soil (snow) and its disinfection, delivery of water for the preparation of degassing solutions, neutralization of certain AChHS and other tasks.

Scout chemists (together with disinfection groups) determine what AChHS formed the focus of chemical contamination, the degree of contamination of the terrain, buildings and structures and denote the boundaries of the outbreak and the ways to bypass it.

Disinfection groups, primarily localize the focus of chemical contamination, degrade the access passages to objects where firefighting should be carried out, work is carried out to search for and help affected people as well as the withdrawal of people from the contaminated area. When decontaminating AChHS, it should be borne in mind that some of them when reacting with degassing substances, release a large amount of heat and this can lead to fires and explosions. In these cases, the disinfection is carried out with a mixture of degassing substances with sand or Earth.

Firefighting teams primarily combat fires that prevent the advance of forces to sites (objects) of work and make it difficult to conduct EROUW. In the future, they localize and extinguish fires in the locations of equipment under high pressure, explosive and poisonous substances rescue and evacuate people from burning buildings, structures and fire zones[13].

Accidents of process equipment at chemical industry facilities are often accompanied by spreading of burning liquid over the surface as a result of which a large area can be covered by fire. When localizing such fires, measures are taken in the first place to prevent further spilling of the burning liquid.

The main way to extinguish a burning liquid is to isolate it from the surrounding air. This is achieved by the introduction of non-combustible gases or water vapor between the surface and the combustion zone, using defoaming mixtures.

When burning liquids in tanks (tanks, storages), it is also necessary to isolate the combustible substance and its vapors from the ambient air. In one case, this is achieved by closing hatches and manholes with asbestos, iron sheets or other materials, in the other by isolating the combustion zone with water. When burning liquids with a specific gravity less than one, the combustion zone can be insulated with foam or non-flammable gas.

When burning various process gases as a rule, one should not attempt to eliminate combustion before the outflow of flammable gas ceases, since the outgoing combustible gas can form an explosive mixture with air. To prevent mixing of combustible gases with air can be by creating inert barriers from carbon dioxide, foam, water vapor, nitrogen.

Rescuing people from burning buildings and structures, fire fighting units are carried out in cooperation with rescue and other formations. The fire-fighting formations that have completed the work are removed from the lesion focus, carry out special treatment, repair fire equipment and replenish the stocks of fire-extinguishing means.

Rescue units, reinforced by means of mechanization, sanitary guards (links), with access to the site (object) of the work are dispersed and search for the stricken, remove them from blockages, open protective structures, rescue people from damaged and burning buildings and provide them with first aid, take out to the places of loading on transport.

The structures of buildings and structures that threaten to collapse and prevent the conduct of rescue work or strengthen or collapse. Affected, located near the surface of the blockage and under small debris, are extracted by examining the blockage from above by hand and located in the depth of the blockage (under the rubble) through galleries arranged in the rubble, using voids and crevices formed from large elements of destroyed buildings, on.

When extracting the affected from under the rubble or from individual debris, it is necessary to avoid shifts of

the elements of the blockage (debris) and to cause additional injuries to the affected, releasing the head and upper body first of all. After the extraction, the first medical aid is provided to him and, if possible, this assistance is provided even before it is extracted from the dam[14].

Rescue of people from damaged and burning buildings with destroyed entrances, rescue stairs, fire-fighting and other formations is carried out by removing and carrying them out through openings made to adjacent rooms with preserved outcrops, or by ladders arranged for it as well as through window openings and balconies with using stairs, car lifts and rescue ropes.

The withdrawal and removal of the affected are made by the calculation of rescue links in the composition of 3-4 people, one of whom is appointed senior. When rescuing people from the sheltered shelters and other protective structures, first of all, a connection with the sheltered is established, their condition, the degree of damage to the filter-ventilation equipment is revealed, after which the method of opening the protective structures is determined. In buildings, if necessary, first of all air is supplied.

In case of threat of flooding or gas contamination of the shelter, damaged municipal energy networks are immediately disconnected. Personnel of formations working on digging out and opening of protective structures must have electric and gas welding apparatus, kerosene cutters, fire extinguishers and in case of chemical contamination-PPE, antidotes, PPI.

When carrying out EROUW in a hotbed of chemical contamination, special attention is paid to providing unprotected workers, employees and the population with personal respiratory protection, providing medical assistance to the affected and withdrawing them from the disaster area as well as localizing and eliminating accidents on communications (vessels) of the AChHS.

The first medical aid is rendered to the injured in self-help and mutual assistance as well as by the personnel of the medical units of the formations, sanitary squads and rescue teams directly at the site of the victim's detection. At the same time, first of all, help is given to the affected AChHS (wear gas masks, if necessary, inject antidotes, wash off toxic liquid from open areas of the body) as well as stricken with asphyxiation, bleeding, penetrating wounds of the abdomen and chest.

Removal of injuries from sites (objects) works to places of loading on motor transport is carried out by stretcher links. Easily attacked on foot on medical points on their own or with accompanying. At the places of loading on vehicles, medical sorting of the evacuations affected by urgency is carried out, the correctness of the attachment of harnesses, bandages, tires is checked, anesthetics are introduced, the adaptation of the transport to the transport of the affected is checked, their correct placement in transport is checked, the accompanying personnel from among the sandwiches (links) or light-weighted.

The first medical aid is affected in the first aid units and in medical institutions. After the expiration of the established time or when the personnel have established the established radiation doses, the formation is changed. The order of the shift is determined by the senior manager.

In order to ensure continuous work, a change of working personnel is carried out directly at the workplace. The technology of the changing formation, if necessary, is passed on to the personnel who came to replace the shift. The commander of the new formation informs the newly arrived commander about the situation and the order of communication with the senior commander.

After the transfer of the objects of work, the replacement formation is assembled in the established place, where the presence of people and tools is checked, then it follows to the collection area. From the gathering area, the formation, if necessary, is sent to special treatment or to the location area.

In the area of the location, the readiness of the formations for further actions is restored, the PPE, devices are replaced and repaired, maintenance of the machines is carried out and the material, technical and medical supplies are expended[15].

In concluding the consideration of the matter, it is necessary to recall that the foregoing is only general provisions on the organization and conduct of EROUW. In each specific case, it is up to the head or the official who is authorized to decide on the issues of carrying out emergency rescue and other urgent works in order to accomplish the assigned task.

DUTIES OF OFFICIALS ON ORGANIZATION AND MANAGEMENT OF EROUW

Preparation for works on the site (territory): EROUW are conducted by the forces and means of organizations, local self-government bodies, executive authorities in the territories of which an emergency situation has developed. Obligations of organizations, bodies of local self-government:

- Ensure the creation, preparation and maintenance of the readiness for the use of forces and facilities for the prevention and liquidation of emergencies
- Ensure the organization and conduct of emergency rescue and other urgent work at the subordinate production and social facilities and in the adjacent territories in accordance with plans for the prevention and elimination of emergencies

Prior to the introduction of rescue units into the facility (territory), complex (radiation, chemical, bacteriological and engineering) reconnaissance should be carried out. After reconnaissance, an object (territory) is reconnoitered with determination of the volumes and methods of conducting the EROUW required for this force and means.

The object (territory) is divided into work sites as well as by types of work. To the reconnaissance, the leaders of EROUW are compulsorily involved. In the absence of time for reconnaissance, EROUW begin with reconnaissance. Exploration should be carried out after reconnaissance, if there is a need for it. Organizational arrangements for the preparation and conduct of EROUW. In the absence of a threat of emergencies:

- Gathering information about possible emergencies
- Planning of EROUW in possible emergency zones, including planning for ensuring the actions of forces
- Establishment of a system for managing the actions of forces and assets of the emergency for the implementation of EROUW
- Organization of day-to-day monitoring and laboratory monitoring of the state of the environment, the situation at potentially hazardous facilities and in the adjacent territory
- Creation of reserves of material resources for liquidation of consequences of emergency situations

In case of emergency: Bringing management systems in readiness to perform tasks. Clarification of plans for the prevention and elimination of emergencies. Strengthening of monitoring of the state of the environment, forecasting the possibility of occurrence of emergencies and their scales.

Creation of a grouping of forces and means of the ESDP and bringing it into readiness for the conduct of EROUW (including the nomination of an emergency in the area).

When an emergency occurs:

- Restoration of disturbed functions of control systems, if they were violated
- Organization of reconnaissance of emergency zones, implementation of continuous monitoring and collection of information on the situation
- Restoration of combat capability (if necessary) or the creation (if not previously established) of a grouping of forces and equipment, the organization of the protection of personnel
- The deployment of forces to the EROUW area
- Management of the EROUW

General management of the organization and conduct of the EROUW at the site (territory) is carried out by the Commission for Emergency Situations and Fire Safety (CES and FS) of the facility (territory). Management of all the forces and resources involved in the liquidation of emergencies and the organization of their interaction are carried out by the leaders of the emergency response, identified by the plans or appointed for these purposes. They are responsible for the organization and conduct of the EROUW, the safety of the people involved in the EROUW.

Heads of rescue services, formations that arrived in the emergency zone first assume the authority of emergency managers and execute them until the arrival of staff managers of emergency response (persons identified by the legislation of the Russian Federation, plans for prevention and liquidation of emergencies designated by public authorities, bodies local self-government, heads of organizations), whose powers include the liquidation of emergency data[16].

Decisions of emergency response managers aimed at eliminating emergencies are mandatory for all citizens and organizations in emergency zones. No one has the right to interfere in the activities of emergency managers when managing emergency response work, not otherwise than by removing them in the prescribed manner from the performance of duties and taking over the management or appointing another official.

The head of the EROUW is required to:

- Carry out reconnaissance and assess the situation at the site of the EROUW
- Put the tasks to the units, organize their interaction and ensure the fulfillment of the assigned tasks
- Continuously monitor the changes in the situation in the course of EROUW and take appropriate decisions, if necessary call additional forces and resources and arrange their meeting and arrangement
- Create a reserve of forces and resources, organize shift work units, food and rest
- Appoint a person responsible for compliance with security measures
- Arrange points for the collection of victims and medical care
- After the completion of the work, listen to the commanders of the units, if necessary, personally verify the completion of work in certain sectors (sectors)
- Determine the order of departures from the EROUW place of units and the interacting services

In case of emergency, the leaders of the emergency are entitled to make their own decisions:

- About carrying out of evacuation actions
- On stopping the activities of organizations located in emergency zones

- On the conduct of EROUW at the sites and territories of organizations located in emergency zones
- On organization of people's access to emergency zones
- On the reservation of reserves of material resources for the liquidation of emergencies of organizations located in emergency zones
- On the use of communication equipment, vehicles and other property of organizations located in the emergency zones
- On the adoption of other urgent measures due to the development of emergency situations and the progress of work to eliminate them
- About involving emergency rescue units and rescuers not included in these formations in the process of liquidation of emergency situations, provided they have documents confirming their certification for the implementation of EROUW

The heads of liquidation of emergency situations are obliged to take all measures to immediately inform relevant state authorities, local self-government bodies and management of organizations of decisions taken in case of emergency. When determining the need for additional forces and facilities, the head of the EROUW should consider.

The dynamics of the development of an emergency situation, the impact of certain factors prior to the introduction of the forces and means invoked.

The required number of forces and means for carrying out work to save people, to open and disassemble building structures and evacuate property. The need to attract special services and funds.

When making changes in the alignment of forces and assets involved in the conduct of the EROUW, the rescue manager must decide to regroup and bring it to the heads of the units, indicating to whom, where and how to regroup.

Heads of emergency liquidation, heads of rescue teams have the right to complete and reliable information about emergency situations which is necessary for organizing work to eliminate them.

SAFETY MEASURES FOR EMERGENCY RESCUE AND OTHER EMERGENCY WORKS

On the ground, infected with radioactive and poisonous substances: To ensure the conduct of rescue operations in foci contaminated with radioactive substances, strict adherence to the established regime is required which regulates the maximum allowable time for the personnel to stay (work) in the form of civil defense, including the travel time from the areas of location to the lesion center and back as well as the rest time in the anti-radiation shelters.

In all cases, the total radiation dose for humans should not exceed 50 roentgens. The planned increase in the exposure of citizens involved in the elimination of the consequences of a radiation accident, rescue operations and decontamination may be due only to the need to save people and (or) prevent even greater exposures to them. Irradiation of citizens involved in the elimination of the consequences of radiation accidents should not exceed >10 times the average annual value of basic hygienic standards for workers (personnel).

The planned increase in the exposure of citizens involved in the elimination of the consequences of radiation accidents is allowed once during their lifetime with their voluntary consent and preliminary information on possible doses of radiation and health risks.

These provisions of the law are in place to eliminate the consequences of a radiation accident in peacetime conditions. Work in the conditions of the outbreak of hostilities or the liquidation of these actions in a radioactive contaminated area is allowed, provided that the personnel of the formation of the civil defense do not receive a radiation dose that is more than permissible under the conditions of military time.

When working on a radioactively contaminated terrain, the personnel of the formations must take the necessary measures to protect the respiratory and skin organs as well as to prevent the ingress of radioactive dust into the body. To do this, it is provided with personal protective equipment for the respiratory system and skin, respirators, cotton-gauze bandages.

The duration of continuous work in personal protective equipment depends on the physical condition of the worker, the nature of the load, the temperature conditions and the degree of his training. Admissible working time in protective clothing in summer conditions does not exceed 2.

At temperatures above +170°C, it is necessary to arrange a periodic rest for the person for 20-30 min, during which you can remove the gas mask and other protective equipment in places that are protected from radioactive contamination.

To reduce the impact of radioactive radiation in the lesion area, personnel are forbidden to work without mittens, drink, smoke and eat.

An important condition for ensuring the safety of the personnel of the formations on the radioactively contaminated terrain is the constant radiation monitoring of the irradiation, carried out by taking readings from individual dosimeters. The commander of the formation is obliged to control the radiation of personnel the data received are recorded in a special journal. He also controls iodine prophylaxis before injecting the formation into the lesion focus (taking stable iodine preparations iodide potassium or a water-alcohol iodine solution).

Poisoning Substances (PS) can be used to infect the environment in order to harm people and animals, impede the actions of civil defense forces and disrupt the life of cities and economic objects. Especially it reacts to PS nervously-paralytic, dermal-abscess and psychogenic action.

When conducting rescue and other urgent work in the area of chemical contamination, the following safety measures should be observed:

Do not inject the formation into the lesion without its reconnaissance. Clearly know the type of poison, its toxicity, resistance, combat state. Provide personnel with personal respiratory protection and skin protection, AI-2 first-aid kits, anti-chemical packages, chemical reconnaissance devices such as the Military Chemical Reconnaissance Device (MChRD).

After leaving the personnel from the center of chemical contamination, perform obligatory sanitary treatment and degassing of clothes. Near buildings and structures that threaten landslides, in smoky and gas contaminated areas

It should always be remembered that work among destroyed and damaged buildings and structures is dangerous. Jolts, earth shaking during work can cause additional damages to damaged buildings or their structures. Therefore, before the beginning of the work, it is required to conduct thorough engineering reconnaissance, to determine the possibility of the safe presence of personnel of formations in destroyed or partially damaged buildings and structures or nearby.

Damage to utility and power utility networks makes it much more difficult to conduct emergency rescue operations, creates a number of additional difficulties (flooding, gas contamination, etc.). When inspecting a building, first determine the state of external walls and overhanging parts, cornices, balconies, etc. Inspection of internal structures is carried out depending on the condition of the building.

It should be remembered that the collapse of individual building elements can occur not only at the time of the explosion but also after a while. Therefore, the walls and other parts of the destroyed building should be approached from the least dangerous side and listen if there is a characteristic rustling and crackling indicating continuing deformations and the possibility of an early collapse of structures. In such cases, a way is set for a rapid withdrawal. It should be smooth and relatively free, allowing you to quickly retire from a dangerous place.

When traveling in blockages or destroyed buildings, care must be taken and pass only through special aisles. To cross the ditches, trenches, excavations it is necessary to arrange bridges with a width of at least 0.8 m. When disassembling blockages of buildings and structures, it is necessary to comply with the safety requirements established for this type of work. First of all, it is necessary to carefully monitor the state and stability of structures and large elements of debris.

In the event of cracks, subsidence and other types of deformation of heavily loaded elements (beams, columns, slabs, etc.), it is necessary to immediately stop work and remove personnel from the danger zone.

At the passages and entrances to the territory where the work is being done, signs and inscriptions are posted, warning of the danger and determining the basic requirements of the measures of safety.

It is forbidden to disassemble structural elements of buildings simultaneously in several tiers of safety rules. They must be disassembled so that another part does not suddenly collapse.

Brick vaults of large spans are dismantled by hand from the top to the arch supports, except those whose durability is in doubt. Unstable structures of damaged buildings are fixed or crumbled. Unstable is considered a brick wall, deviated from the vertical by >1/3 of its thickness.

The collapse of unstable, threatening structures, building elements, is carried out in three main ways: With the help of a tractor, a winch (at the top of the wall, between the interfacing or ledges, a cable is attached, the other end is attached to the tractor (bulldozer), the winch.) The rope length must be at least two to three heights of the collapsed structure).

With a ball-woman suspended from a crane or excavator (the wall is destroyed by impacts of a metal ball weighing 1 -2 tons). With the help of a directed explosion (holes are drilled, small charges of explosives are laid in them, they are clogged with sand or ground to enhance the explosion effect and underpast).

To facilitate the collapse of the wall, it is cut down from the bottom by 1/3 of the thickness and cut through the vertical. When working with load lifting machines (truck cranes, excavators), the characteristics of the lesion focus are taken into account.

When clearing debris and loading debris to vehicles, vehicles can be re-loaded. In most cases, it occurs due to the adhesion of broken elements to each other, the presence of reinforcement and can lead to loss of stability and overturning.

When disassembling blockages by truck cranes on pneumatic or caterpillar tracks, it is forbidden to pull out long constructions from blockages. When excavating trenches and trenches, all necessary measures are taken to prevent collapse of walls and slopes.

It is forbidden to develop unsupported sandy, sandy loamy and forest soils without fastening. Vertical slopes are allowed in soils of natural moisture and only up to a certain depth which for various soils is, m: Bulk, sandy and gravely 2,2; Sandy loams and loamy ones 1,5; Clay, 1.7; Especially dense non-scall 2,2.

When working on slopes of excavations and embankments with a depth (height) of more than 3 m and a steepness of >1: 1 and with a wet slope 1: 2, the personnel of the formation must have safety belts.

On networks and structures of water supply: Emergency work in foci of damage on water supply systems is required to be carried out in a short time while observing safety measures.

To successfully perform the work on localization of accidents on water supply networks, it is necessary to have a plan for their location. Wells, chambers and other structures that can be contaminated should be marked. At least three people are allowed to work in the wells. Descend into the well is allowed only one. It must have a safety belt, a gas analyzer or a special lamp.

Before the descent, the gas contamination of the air is checked with a gas analyzer or a lit gasoline lamp. In the presence of methane or hydrogen sulphide, the flame in the lamp decreases, from the presence of carbon dioxide will go out, from the vapors of gasoline, ether will increase.

Excess of gas can be eliminated by natural ventilation or with the help of a fan and also by filling with water followed by pumping. It is strictly forbidden to remove gas by burning. If the gas content can`t be eliminated completely, the presence in the well is allowed only in insulating masks.

Work in the water wells is carried out with pumps disconnected. Engines, motors, machines are repaired only after they are stopped, while electric motors, starting, regulating and other devices must be grounded. Repair shut-off devices on water supply networks are allowed only after their release from water.

On sewage networks and structures: Emergency and other urgent work in these cases is not much different from work on water supply systems.

Therefore, the safety measures for emergency work on the networks and structures of the canalization are similar. As a result of an accident or destruction, harmful flammable liquids (acids, alkalis, oil, gasoline, kerosene, etc.) can enter the sewer network.

When fecal matter decomposes, harmful and explosive gases are formed methane, carbon dioxide, hydrogen sulphide. Therefore, it is not allowed to use open fire at pumping sewerage stations, filtration fields, sewage disposal sites, constant air quality control is required. Work in the chambers and special wells should be performed in at least four people and in the passageways and collectors, five. One works in a collector, two observers are at each well.

On networks and gas supply facilities: Gas fuels have hazardous properties that must be taken into account in the production of work:

- The ability of all combustible gases to form explosive mixtures in certain volumetric ratios
- Suffocating effect on a person
- Toxicity of some, mainly artificial, gases
- Increased fire hazard

All combustible gases, if they accumulate indoors, pose a great danger. Artificial gases contain in their composition highly toxic carbon monoxide CO. If this gas in the air is 0.15% in half an hour, severe poisoning can occur and at 0.4% in 20-30 min death.

Most artificial and part of natural gases also contain highly toxic hydrogen sulphide. It affects the nervous system and can lead to the stopping of breathing or paralysis of the heart. Toxic, dangerous properties of gas may appear earlier than explosive concentration.

Artificial gases are more dangerous than natural gases, since, they have almost the same degree of explosion and are more toxic. Therefore, the production of emergency work on sites requires special care.

Natural combustible gases in most (up to 98%) consist of harmless methane CH4 and do not contain other harmful substances but they are also dangerous: a significant concentration in the air can lead to suffocation. In addition, gases form explosive mixtures with air, the ignition of which leads to an explosion.

To gas hazardous works are:

- Repair of existing gas pipelines and structures on them without disconnecting incoming gas
- Connection of gas pipelines to the existing ones
- Gas start-up in gas pipelines
- Gas appliances, units
- Inspection and ventilation of wells

Gas hazardous works are performed only by specialized units that have passed the safety training and are allowed to work. Work is carried out in at least two or three people. When descending into a well, a trench, a cellar, it is necessary to be in personal protective equipment, an insulating gas mask and to have a life belt with a rope. Shoes should be without steel hosiery, nails preferably rubber.

Certain requirements are imposed on the tools during operation they should not form sparks and should be made of non-ferrous metal (copper, aluminum) or covered with a layer of copper. Their working part is abundantly lubricated with a solidol, technical petroleum jelly or other thick grease.

It is forbidden to use electric drills and other electric tools that cause arcing. To illuminate the place of production, personal luminaires are used in explosion-proof design or battery-type lamps of the miner type. It is necessary to check all gases and structures for gas contamination at least every 1.5 h. When gas is

detected, the premises are ventilated. It is forbidden to smoke, build fires, use instruments with open fire near gassed structures.

On networks and power supply facilities: All rescue operations on power grids and structures in order to avoid electric shock should be carried out under conditions of their full de-energization and strict adherence to safety measures.

The physiological effect of electric current is that when passing through the human body, the normal transfer of biocurrents going from the cerebral cortex to the muscles and internal organs is disturbed as a result of which paralysis of the respiration or heart, called electric shock, may occur.

In case of electric shock, other injuries and burns are possible. When passing through a person's body, the current can increase to dangerous for life. If the victim is without breath for more than two minutes, his condition deteriorates sharply and to revitalize the body is very difficult. Therefore, after the release of the victim from the action of the current, he is immediately assisted.

In the absence of breathing and pulse, he needs to do artificial respiration and indirect heart massage, for which the victim should be laid on his back and unbuttoned clothing, embarrassing breathing.

Touching the live parts causes a spasmodic condition in most people, an involuntary convulsive contraction of the muscles because of this a person is not able to release the wire from his hands. If the victim was in this situation, it is necessary to release him from the action of electric current to disconnect the network from power sources or to separate the victim from the ground (with precautionary measures). To do this, wear rubber gloves, galoshes or throw on a rubber-coated cloak or cloak. You can also stand on a dry board.

The cause of electric shock is the absence or inadequacy of protective equipment. That is why gloves, galoshes, bots, rugs, insulating stands and so on must be checked in advance in the laboratory. Before starting work on electrical networks, you must disconnect them from both sides of the work site. In addition, the disconnected sections on both sides of the work site are grounded.

As a rule, all damaged power lines and structures are restored by specialized emergency response teams. Emergency rescue teams may be involved in the performance of subsidiary work. On high-voltage networks for:

- Simple earthing devices
- Disassembly of metal and wooden supports
- Laying temporary bridges between transformer kiosks

For low voltage networks (380-127 V): Cleaning wires from the ground and suspending them to poles, walls. disconnection from the network of the damaged area by the switch, disconnecting beforehand. Custodians or a piece of wire from the network. Temporary lighting devices from the city network by laying crosspieces. The simplest connection of wires by twisting, couplings, sleeves and clasps.

Personnel who conduct electricity supply work should be trained to provide first aid to victims of electric current.

On the networks and heat supply facilities: Rescue and rescue operations on heat supply networks with high heat carrier parameters (water temperature up to 1500, steam up to 300°C, pressure 1.5 MPa) are associated with great danger and they should be performed by well-trained people under the guidance of experienced specialists.

To ensure the security of the personnel of the formations and to prevent accidents on the heat supply networks, the most responsible work is carried out only by special orders with observance of special security measures.

Such works include:

- Disconnection of operating heat pipes (including installation and removal of plugs)
- Repair of electrical equipment and welding work in chambers and tunnels
- Application of the thermal insulation layer to the operating heat conductor
- Heating and starting steam lines
- Test at design temperatures, etc.

The chambers (wells) of underground heat pipes must have at least two hatches with stairs and staples. Repair of heat pipes in semi-pass chambers is allowed only when the pipelines are disconnected from both sides and at a coolant temperature of not >80°C. The air temperature in the channel must not exceed 50°C. At a temperature of 40-50°C it is allowed to work for 20 min with interruptions and exit from the chamber for at least 20 min.

The heating and commissioning of steam pipelines are among the most dangerous works and they are carried out with extreme caution. Fill the heating network with water, the temperature of which is not >70°C, only through the other line. Use of open fire is prohibited. Also, it is not permitted to carry out repair work on equipment under pressure and tension. The concentration of gas in chambers and tunnels should not exceed 1/5 of the lower limit of its explosive capacity and should not be higher than the allowable by sanitary standards. Work in chambers where the concentration of gas is higher than permissible is not permitted.

In the centers of mass fires: The fight against fire is the task of fire-fighting units but the situation can require participation in the work on localization and elimination of fires of other formations. In this case, people can get burns of varying degrees, for a long time to be exposed to the irritating and suffocating action of smoke. The most dangerous are thermal radiation, air contamination with combustion products (carbon monoxide) and smoke, reducing visibility to 10 m. Concentration of carbon monoxide in the air 0.2% and higher fatal. Therefore, when performing work in such conditions, the personnel of the formations must have appropriate clothing and equipment and also observe certain rules of safety engineering.

Work in blockages with high gas contamination with carbon oxides is limited to 30-45 min, after which the worked shift is immediately withdrawn from the danger zone. It is necessary to have a supply of oxygen and medical equipment to provide emergency assistance for poisoning with carbon monoxide.

When working in heat-reflective suits and insulating masks, the duration of the shift can be increased. In this case, it is necessary to take into account the specific fire in different parts of buildings (basements, floors, attic floors, etc.). In the basement there is a rapid spread of fire and smoke to the upper floors through openings, ventilation ducts, elevator shafts, etc. Due to lack of oxygen, incomplete combustion of substances occurs here, the concentration of carbon oxide increases.

Before entering the smoky room, a security post is installed. Constantly it is obliged to maintain a constant communication (through an intercom or voice) with a working staff. In smoky rooms, you should move along the walls closer to the windows, be sure to remember the route of travel along the characteristic objects, signs, number of turns, layout of rooms, equipment, etc. The path of movement is carefully examined by touching the foot, tapping with any object. To avoid burns, doors must be opened carefully, remaining under the cover of the door leaf. The most inaccessible part of the buildings are the attic rooms. Often, the work is carried out on high roof slopes in conditions of high temperatures and smoke which requires special precautions. So, on the roof with a slope of skates >30°C it is necessary to use the insurance of workers. It is known that the water is electrical, so it can't be extinguished electrical installations that are under voltage. As well as gasoline, kerosene, oil and other combustible liquids.

The most effective means of extinguishing fires in tanks as well as spillage of petroleum products is air-mechanical foam. In this case, the place of fire should be a bulldozer for repairing dumps or to create additional shafts in case of their spreading.

The immediate task in extinguishing fires is the immediate provision of assistance to people. First, those who are in places with a high temperature and heavily smoky are rescued. In the event of fire, it is necessary to quickly shoot off the flame and stop the air access to the burning place. It is necessary to conduct continuous observation of the fire situation change in order to prevent the environment from being fired by the workers, was "rendered" the first medical aid to the victims.

In case of an accident at a chemically hazardous facility: The high danger for the population is represented by accidents with the release of chemically hazardous substances (AChHS). In general, they occur on chemically hazardous objects. In the lesion focus, damage and destruction of pipelines, equipment, spilling liquids onto the surface and release of vaporous products into the atmosphere are quite likely.

Safety measures for work in the lesions will primarily depend on the nature of these substances, on what means they are rendered harmless. And also from meteorological conditions, primarily from air temperature and wind speed. In the summer, the AChHS evaporates faster which increases their concentration in the lesion. The stronger the wind, the faster the adjacent areas are infected but the poisonous cloud dissipates faster.

To eliminate the accident, first of all, the personnel of the gas rescuer service and the formation of the facility are involved. If these forces are not enough, then additional resources of city services, districts, districts are allocated to help. In all cases, participation of medical units is mandatory. The personnel of a chemically dangerous facility should have industrial and insulating masks, protective clothing in accordance with the type of AChHS that is dangerous. Formations of civil defense are provided with insulating masks or filtering with additional ammunition. After the end of the work, sanitary treatment and degassing of the equipment protection equipment are mandatory.

CONCLUSION

At night and in conditions of poor visibility: When performing rescue operations in conditions of poor visibility and at night, it is necessary to organize lighting of areas of the territory, separate objects of rescue operations as well as main and access roads, through which people and equipment will be moved. In the obstructions, mines, destroyed openings of buildings and structures, red light signals should be installed in the work sites. When performing work in damaged buildings and structures where an emergency lighting device is impractical or impossible, a head mine light bulb is recommended that is attached to the headgear or clothing. In the areas of stressed cargo areas, emergency lighting should be provided in the area of damage and lights and signs of traffic should be provided at corners and in places

that require special precautions when driving traffic. The operation of cranes at night can be resolved only on condition that good lighting is provided, if there is an alarm and that other means can't be used for loading and unloading.

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