EMERGENCY - RESCUE AND OTHER EMERGENCY WORK IN THE EVENT OF ACCIDENTS ON THE RAILWAY AND AIR TRANSPORT

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Annotation : This article discusses the issue of emergency rescue and other urgent work in case of accidents in railway and air transport. Particularly emphasized when extinguishing fires on the railway and air transport. The main tasks of rescuers in assisting the victims, in extinguishing a fire, protecting neighboring trains and buildings from fire, in protecting the natural environment are considered.
Keywords: railway transport, aviation, liner, rescue work, assistance to victims, fire, environment.

For the transportation of passengers, compartment, reserved seat and general carriages are used. The average composition of a passenger train: long-distance traffic - 14 cars, commuter traffic - 8 cars.

The length of the car - 23.6, width - 3.06, height - 4.36 m; weight - 52-55 tons. The cars are equipped with two inward-opening doors measuring 80x185cm. They are equipped with special locks that open with a three- or four-sided socket key [1].

The width of the passage inside the car is 110 cm, the car is equipped with power supply, ventilation and heat supply systems.

In collisions, sudden stop of the train and overturning of cars, typical injuries are bruises, fractures, concussions, and compression. To assist the injured in the car, the rescuers must:

get into the car through the entrance doors, window openings and specially completed hatches; organize the search for victims, their release, evacuation; arrange first aid for the victims.

Figure 1. Rescue work during a railway accident

Rescuers can enter the car through the entrance doors after opening them from the outside or from the inside of the car [2].

In case of jamming, a crowbar, sledgehammer, chisel, metal cutting tool is used. Ladders and hinged ladders and ropes are used to enter the car through window openings. In some cases, it is possible to get into the window by hoisting the rescuers or dragging them by the arms, while it is necessary to first remove sharp pieces of window glass. After the rescuers enter the car, they proceed to open the compartment doors, search for the victims, provide assistance to them, and evacuate. In case of finding victims under the car, rescuers must lift it up and free people. These works are carried out with the help of cranes or special high-capacity jacks. Sometimes, to extract the victims, a dig is made in the ground or an opening is made in the structure [2].

Fires in carriages pose a particular danger to passengers. A fire in a passenger car spreads very quickly through the interior trim, structural voids and ventilation. It can cover one car after another. This happens especially quickly during the movement of the train, when the car burns out completely within 15-20 minutes. The temperature in the burning car is about 9500C. Passenger evacuation time should be no more than 2 minutes.

A fire on diesel locomotives is complicated by the presence of a large amount of fuel (5 - 6 tons) and lubricants (1.5 - 2 tons).

The main tasks of rescuers in case of a passenger train fire are: conducting a quick search and prompt evacuation of passengers from wagons to a safe place; search for passengers who left the burning train during movement; fire extinguishing [4].

Sometimes passenger trains can be blocked by snowdrifts, landslides, rockfalls, avalanches, mudflows, and water. In these cases, the task of rescuers is reduced to the detection of victims, release and assistance to them.

When extinguishing fires on the railway, the main task of rescuers is to assist the victims, extinguish the fire, protect neighboring trains and buildings from fire, and protect the natural environment. The height of the flame when burning a tank with liquid

combustible materials is 40-50 m, and the burning area covers an area of 1500 m2 or more. When burning tanks with flammable liquids, it is necessary to organize their cooling with water. In case of combustion of liquid vapors above the open neck of the tank, it is necessary to close the lid under the protection of the barrels or throw a felt mat (tarpaulin) over it.

The burning spreading liquid is extinguished with water, foam, adsorption materials. It is possible to divert the spilled liquid through ditches or to mound the earth to direct the liquid to a safe place.

In case of burning of several tanks at the same time, efforts must be directed to their cooling and protection of neighboring wagons and tanks. If there is a threat of fire to neighboring trains, the burning tank must be taken to a safe place and extinguished. When burning cylinders with compressed or liquefied gas, work must be carried out only from a shelter. If it is impossible to eliminate the flame of burning gas, it is allowed to burn out freely with constant cooling of the tank with water to reduce the likelihood of an explosion. When extinguishing a fire in rolling stock with toxic, poisonous and explosive substances, the following should be done:

move the burning train to a safe place; extinguish the fire with powerful water jets;

open doors and hatches; coordinate their actions with the persons accompanying the cargo.

Explosions occur as a result of violation of the rules for the transportation of explosive cargo, the accumulation of an explosive mixture along the route of the train, fires, and terrorist acts. The explosion of a tank with liquefied hydrocarbon gases is characterized by the ejection of a flame to a height of 120150 m, throwing the tank to a distance of up to 100 m, and metal fragments - to several hundred meters. In the event of explosions on the railway, rescuers should direct their efforts to search for and provide assistance to the victims, neutralize and decontaminate the affected areas, and conduct control measurements of the presence of harmful and hazardous substances in the air, water and soil [9].

Features of elimination of consequences of accidents (catastrophes) in air transport

If an accident on air transport occurred in the area of the airport, then the direct organization of search and rescue of the crew and passengers of the aircraft is assigned to the head of the airport with the involvement of forces and means from aviation units (enterprises and organizations) based at this airfield, regardless of their departmental affiliation [5].

Rescue work in such cases is carried out by emergency rescue teams, which include crews from various services (dispatching, starting, fire and rescue, medical, engineering, special transport, transportation, police, etc.).

Priority measures to save people in such an accident, as a rule, are associated with the evacuation of passengers from the aircraft. According to the requirements of the International Civil Aviation Organization (ICAO), all passengers must leave the aircraft in the event of an accident on board through the exits located on one side in 90 seconds.

In this case, all main, service and emergency doors must be used to evacuate people. The evacuation of people can be carried out through the rifts in the fuselage, special hatches made by rescuers, cargo hatches, windows in the cockpit. It must be remembered that the

design of the emergency exit locks makes it possible to open them both from inside the cabin and from the outside, that is, this work can be performed by a rescuer.

Rice. 2. Rescue operations in case of a plane crash

When organizing rescue operations in the event of a fire on board an aircraft, it must be remembered that: after 2-3 minutes. after the onset of fiery combustion, carbon dioxide in the cabin reaches a lethal concentration; the temperature inside the passenger compartments increases sharply along their height (at the floor level - 5000C, and at a height of 1.5 m from the floor - 25000C); fire extinguishing work should be carried out in insulating protective equipment.

Evacuation of passengers should be carried out simultaneously with fire extinguishing from the windward side. Opening the fuselage must begin with the doors, as they have a higher throughput than the various holes made.

Search and rescue operations are organized in the following cases:
when receiving a distress signal from an aircraft, as well as when receiving signals from emergency radio stations (radio beacons); upon receipt of a report from the crew of the aircraft observing disaster, as well as reports of other eyewitnesses of the disaster; if within 10 min. after the estimated time of arrival, the aircraft did not arrive at the destination and there was no radio contact with it for more than 5 minutes; if the aircraft crew has received permission to land and does not made it at the appointed time, and radio communication with him stopped; in case of loss of radio communication with the crew of the aircraft and the simultaneous disappearance of the mark of the radar wiring or loss of radio communication for more than 5 minutes, if the radar wiring was not carried out; in all other cases when the aircraft crew needs assistance [8].

Search and rescue operations begin from the moment the command is given to take off the search and rescue aircraft (helicopter) and to leave the ground search and rescue teams. First of all, with their help, the crash site of the aircraft (helicopter) is detected.

After the landing or disembarkation of the search and rescue team, they are tasked with immediately proceeding with the evacuation of passengers from the aircraft in distress to a safe place. Rescuers are required not only to save people, but also to create the

necessary conditions for their survival, protecting them from bad weather, and providing them with first aid.

After the victims are removed from the disaster zone, rescuers begin to collect the remains of the dead for their further identification. If as a result of a plane crash all the people on board the aircraft died, then the rescuers are obliged to search for and collect the remains of the dead, “black boxes” and ensure the safety of valuables [9].

Prior to the arrival at the crash site of the head of the commission to investigate the causes of the emergency, it is prohibited to carry out any work at the scene of the accident, with the exception of an external examination, fixing traces of the movement of the aircraft on the ground, evacuation of the wounded and the dead. The movement of an aircraft before the arrival of the said commission is allowed only in cases where the emergency aircraft has fallen on a railway, highway, waterway or airfield and prevents the safe movement of vehicles or the landing of aircraft.

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