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TACTICS OF EXTRICATION AND RESCUE OF VICTIMS IN CASES OF OVERTURNING AND DEFORMATION OF HIGH-SPEED PASSENGER TRAIN CARRIAGES

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Rail transport is considered one of the safest modes of transportation; however, accidents involving high-speed passenger trains may result in a large number of casualties, challenging rescue conditions, and a high probability of secondary hazards. Particularly complex situations arise when rolling stock derails, carriages overturn, or structural deformation occurs, trapping passengers inside damaged compartments. Under such circumstances, the effectiveness of rescue operations directly depends on the timeliness of response, the accuracy of situation assessment, and the efficiency of victim extrication tactics.

Modern high-speed passenger trains are characterized by reinforced carriage structures, lightweight high-strength materials, advanced power supply systems, and sophisticated onboard equipment. While these features significantly improve passenger safety during normal operation, they also complicate access to victims following an accident. Structural deformation, damaged doors and windows, displaced seats, and collapsed interior components create numerous obstacles to evacuation and rescue activities.

Upon arrival at the incident scene, the primary task of the rescue operation commander is to conduct reconnaissance and assess the operational situation. It is necessary to determine the number of damaged carriages, the extent of deformation, the presence of fire hazards, fuel leaks, electrical risks, and other dangerous factors. Particular attention should be paid to the possibility of further movement, collapse, or overturning of carriages, which may pose additional threats to both victims and rescue personnel.

One of the most important stages of rescue operations is the stabilization of damaged carriages. In cases where a carriage has overturned or remains in an unstable position, rescue activities should begin only after the structure has been securely stabilized. For this purpose, specialized stabilization systems, pneumatic struts, wooden cribbing, hydraulic supports, and other technical devices are employed. Insufficient stabilization may result in secondary movement of the carriage, causing severe injuries to trapped passengers and rescuers.

After ensuring a safe operational environment, search operations are initiated. Modern rescue practice recommends the use of thermal imaging cameras, acoustic

search devices, video inspection systems, and other technical equipment to locate victims. Particular attention is given to passengers trapped in heavily deformed sections of the carriage, beneath collapsed interior structures, or between structural components. Simultaneously, medical triage procedures and emergency medical assistance should be organized.

The tactics of victim extrication depend on the extent of carriage damage and the medical condition of the victims. In cases of minor structural deformation, priority should be given to the use of standard evacuation routes, emergency exits, and windows. If access through these openings is impossible, additional access points should be created using specialized rescue tools. During such operations, rescuers must consider the structural features of modern railway vehicles, including electrical systems, air-conditioning units, and other engineering components.

In situations involving severe structural deformation, the primary means of extrication include hydraulic rescue tools, pneumatic lifting bags, hydraulic jacks, cutting devices, and other specialized equipment. During rescue operations, it is essential to minimize additional impacts on victims, particularly when spinal, thoracic, or internal injuries are suspected. All actions should be performed in close cooperation between rescue personnel and medical teams to ensure the safest possible removal of trapped passengers.

Particularly challenging situations arise when a carriage is overturned on its side or partially destroyed. Under such conditions, the normal arrangement of aisles, seats, and emergency exits is altered, making navigation inside the carriage significantly more difficult. Furthermore, victims may be trapped in unusual positions, compressed by structural elements, or pinned beneath other passengers. In such cases, a phased extrication strategy should be implemented while continuously monitoring structural stability and the medical condition of the victims.

An important aspect of effective rescue operations is the application of technical rescue principles, including the establishment of safety zones, clear allocation of responsibilities among rescue teams, and the implementation of standardized extrication procedures. Experience gained from major railway disasters demonstrates that the use of unified operational plans significantly reduces rescue time and minimizes risks to emergency personnel.

Special attention should also be paid to cooperation between emergency response agencies, medical services, railway operators, and law enforcement authorities. Effective coordination ensures the timely de-energization of overhead power lines, organized evacuation of victims, deployment of medical treatment areas, and logistical support of rescue activities. The success of disaster response operations largely depends on the quality of such interagency cooperation.

References

1. NFPA 1670: Standard on Operations and Training for Technical Search and Rescue Incidents. Quincy, MA : National Fire Protection Association, 2024. 142 p.
2. NFPA 1006: Standard for Technical Rescue Personnel Professional Qualifications. Quincy, MA : National Fire Protection Association, 2021. 98 p.
- IFSTA. Vehicle Extrication and Technical Rescue. 4th ed. Stillwater, Oklahoma : Fire Protection Publications, Oklahoma State University, 2022. 688 p.

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