

command, including three levels of the strategic, operational and tactical.

Strategic level includes emergency rescue system, mechanism, and law. Its tasks are involved: research and judge the situation of emergency rescue in domestic and abroad emergency events; understand the frontier issues of emergency rescue, make the practical strategy for professional forces in emergency rescue; study the inner link among the leading system, coordination mechanism and relative regulations and laws, provide theoretical support in terms of perfecting system and mechanism for professional emergency rescue forces; investigate the key direction, basic layout and components in building emergency rescue forces, the vertical management and horizontal coordinative mechanism in rescue operation, as well as the involved rules, regulations and laws.

Operational level is joint command of multi-forces that includes: study the command structure and its components, levels, function and general conditions in on-spot joint command^[5]; probe the coordination of professional forces and other forces, like public security and local governments on all-level, along with the organization and implementation of international cooperation in emergency rescue, in particular under the real situation of diversified emergency rescue forces.

Tactical level is on-spot command of emergency rescue. The following tasks should be done: study the on-spot command patterns based on the type of emergency events, software and hardware safeguard measures, the authorization and emergency decision on rescue operation, the quick and accurate delivery in special and sensitive regions, sealing and control of the spot, search and rescue of key targets, etc.

In organization and command of multi-force emergency rescue, being systematic is the focus.

3.2. Risk management of rescue operation

The role of the emergency rescue is to act immediately to prevent damage to life, property or environment^[6]. Richard Yarwood considers the role of the emergency services in controlling, mitigating and resolving risk^[7].

The risk and evolution of emergency events involves: probe the evolutionary patterns of nurturing, happening, development and mutation of emergency events; get to know the types, tense, spatial and temporal distribution of the events by human intervention to stop the mutation for hazard, so as to provide direct scientific support to weaken the consequences.

The acceptor here means the objects which receive the actions produced or released or carried by the emergencies. We need to study the acceptor hazard-affected carrier, functional medium of the harmonious development of human society and natural environment, refers to the action object of emergency events, as well as the protective target of emergency rescue operation. The damage of hazard-affected carrier could lead to the activation or sudden release of its disaster elements, thereby causing secondary and derivative disasters and forming the chain of emergency events^[3]. The key goal should be decided by studying different types of hazard-affected carriers so as to take proper action to block its happening and to achieve effective rescue.

Security management and control of emergency rescue is involved: study the security controlling technique in emergency rescue operation, master scientific methods, moment and dimension to measure and assess operation cost; mitigate the possible damage to the protective target and force staff by optimizing human intervention.

3.3. Equipments and skills

Equipment, technology and training are effective implementation of the basic condition of emergency rescue. The serialized system of emergency rescue equipments is necessary. The research content include the planning, design and application of serialized equipment for professional emergency rescue, command theory and method of equipment maintenance; research and develop new equipment as on-scene UAV (unmanned aerial vehicle) monitoring system in line with the series standards of equipment configuration based on various emergency rescue tasks.

On the basis of the equipment, study professional emergency rescue techniques of typical disasters as earthquake, geological incident, forest fire, flood and drought; learn the repairing technique of traffic facilities as highway, bridge, tunnel, airport and port, the maintenance technique of important highway and tunnels under special time and occasions, the levee engineering rescue technique, the dam reinforcement technique of reservoir and hydropower stations, the engineering danger-elimination technique of the dammed lake, the emergency repairing technique of converting station, transmission wire and oil and gas pipeline, as well as the rescue technique of helicopter. The retrospective review of all search and rescue (SAR) missions within Yosemite National Park during the 10-year study period between January 1990 and December 1999 shows, helicopter was the

primary mode of transport in 28% of SAR incidents [8].

To combine personnel, technology and equipment effectively, must be strengthened skill training of emergency rescue equipment. Probe the training methods, management, safeguard, patterns in view of base, analog, internet and situation, as well as interregional and joint training.

3.4. Information platform

Information is the basis for decision-making, the quality of information to determine the quality of the decision-making. Disasters and crises tend to disrupt the existing social order, resulting in distortion and confusion, affecting the quality of decision-making. Emergency rescue operations need to rely on the information management tools to ensure the smooth flow of information up and down. The fresh, accurate information is essential for effective response to large-scale emergencies. Information, at the top command level, at the field command level, and at the individual emergency personnel level, often difficult to obtain, process, interpret, and use for decision making in practice. So, we must strengthen the research of information hardware and software.

First, study the functional need of information collection, perception, positioning, delivery, summarization, research, distribution, integration and sharing; research, develop and integrate systematic modules as GIS (Geographic Information System), remote sensing and monitoring, professional model, analog emulation, command and control, aid decision making, comprehensive inquiry.

Second, database of emergency rescue cannot be ignored. The database consists of basic database, expert repository, case base of great emergency events, database of emergency events participated by professional rescue forces, model base of disaster prediction and pre-warning, scenario and plan base of emergency rescue operation.

We believe the high-tech but not make a perfect fetish of the high-tech, relying too much on high-tech to miscarriage of justice emergency rescue situation. We must give play to the initiative, and constantly strengthen the application research.

4. Concluding comments

In organizing and commanding, should focus on and improve top design. The emphasis should be laid on the systematic connection of strategy-battle-tactics level to produce a resultant force. In addition, Emergency rescue should be incorporated into the

legal system, standardized and scientific track. In handling multiple types of emergency events, being scientific is the focus. The risk analysis and assessment in the whole process should be strengthened. The emphasis lays on the security management and control of responsive actions. In terms of equipments and skills of emergency rescue for professional teams, being professional is the focus. System and standard should be formed and implemented in specific training courses. As to the direction of informational construction of emergency rescue, being modernized is the focus. The specific functional need of application system and database should be clearly defined.

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