

Discussion on the Construction of Emergency Logistics Management System under the Background of Natural Disasters

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Abstract: Natural disaster is a global challenge, which poses a serious threat to the security and development of human society. In the context of natural disasters, the construction of emergency logistics management system is particularly important. This paper discusses the strategies and methods of constructing an efficient emergency logistics management system from four aspects: technological innovation and application, personnel training and education, synergy and cooperation mechanism effect, and disaster response experience summary and improvement, in order to provide reference for improving the efficiency and effect of natural disaster relief operations.

Keywords: Natural disasters; Emergency logistics management; Construction

Introduction: With the global climate change and the frequent occurrence of natural disasters, natural disasters have caused more and more serious losses to human society. In this context, how to quickly, accurately and efficiently carry out natural disaster relief has become the focus of national and social attention. Emergency logistics management is a key link in the process of natural disaster relief, and its efficient operation in the allocation of relief materials, transportation and information management directly affects the success or failure of rescue operations.

1. The importance and necessity of emergency logistics management system

1.1 Mitigation of disaster losses and impacts

Natural disasters often bring huge loss of human life and property. An efficient emergency logistics management system can quickly deploy relief materials, personnel and equipment after a disaster, and provide timely and effective rescue support for the victims.

1.2 Improve rescue efficiency and effectiveness

Emergency logistics management system involves the reserve, deployment, transportation and information management of relief materials. An efficient emergency logistics management system can quickly organize rescue operations after disasters and ensure that relief supplies are delivered to the affected areas in a timely manner.

1.3 Guarantee social stability and order

Natural disasters often have a serious impact on social stability and order in the affected areas. An efficient emergency logistics management system can quickly restore the basic life and production order in the affected areas after the disaster, and provide the victims with living materials, medical treatment and other support. Through timely rescue operations, the psychological pressure of the victims can be reduced and social stability can be maintained.

2. The core components of the natural disaster emergency logistics management system.

2.1 Early warning and risk assessment

Early warning and risk assessment are the basis of natural disaster emergency logistics management system. The establishment of early warning mechanism can help the government and relevant departments to identify and predict the possible natural disasters

in time, so as to take measures in advance. For example, through real-time monitoring and analysis of meteorological and geological data, the probability and possible impact range of natural disasters such as typhoons, earthquakes and floods can be predicted. Risk assessment focuses on the loss and impact of disasters, which provides an important basis for emergency logistics management.

Table 1: Examples of early warning and risk assessment systems

Information	Description	Example
Temperature	Meteorological data, representing air temperature	25°C
Humidity	Meteorological data, indicating air humidity	80%
Wind speed	Meteorological data, indicating the speed of the wind	50 km/h
Rainfall	Meteorological data, representing the amount of precipitation per unit time	100 mm/h
earthquake level	Geological data, representing the intensity of an earthquake	7.0 level
Terrain Height	Geological data, representing the height of the ground relative to sea level	1000 m
Population distribution	GIS data, representing the distribution of the population in different regions	10000 people/km ²
Status of infrastructure	GIS data, representing infrastructure development in different regions	With or without electricity, communication, etc.
Emergency material inventory	Emergency material data, indicating the type and quantity of materials	Food 1000 pieces, water 500 bucket, tent 300 top
Length of transportation route	Transport route data, representing the length of the transport route	100 km
Transport route capacity	Transport route data, representing the capacity of the transport route	500 vehicles/hour

2.2 Reserve and deployment of relief materials

The reserve and allocation of relief materials is the core link of emergency logistics management system. The classification and stockpiling of relief supplies can ensure the rapid deployment of needed supplies in the event of a disaster. This requires the government and relevant departments to pre-classify and reserve relief materials, and establish a reasonable material distribution and dispatch system. For example, relief materials can be divided into living materials (such as food, drinking water, tents, etc.), medical materials (such as medicine, medical equipment, etc.) and rescue equipment (such as generators, lighting equipment, etc.), and warehouses can be set up in various places for storage. In the event of a disaster, according to the specific needs of the affected areas, the rapid deployment of appropriate materials for rescue.

Table 2: Examples of rescue materials reserve and deployment system

Material classification	Description	Quantity of reserves
living materials	Including food, drinking water, tents, etc.	1000 pieces, 500 barrel, 300 top
Medical supplies	Including drugs, medical devices, etc.	2000 box, 100 table
Rescue equipment	Including generators, lighting equipment, etc.	50 sets, 100 sets
means of transport	Including trucks, helicopters, etc.	20, 5
Communication equipment	Including walkie-talkie, satellite phone, etc	100 units, 50 units
Personnel Equipment	Including protective clothing, life jacket, etc.	500 pieces, 200 pieces

2.3 Transportation and Distribution

Transportation and distribution is the key link of emergency logistics management system. In the aftermath of a disaster, rapid transportation of relief supplies to the affected areas is critical to the success of relief operations. To this end, it is necessary to establish an efficient transportation network and distribution system, including the selection of appropriate modes of transportation (such as roads, railways, aviation, etc.), planning the best route, and ensuring safety in the transportation process ^[1].

Table 3: Examples of transport and distribution systems

Mode of transport	transport speed	Transport load
road transport	60 km/h	50 tons/car
railway transportation	80 km/h	100 tons/car

Mode of transport	transport speed	Transport load
Air transport	800 km/h	10 tons/rack
waterway transportation	20 km/h	500 tons/ship

3. Strategies and methods for building an efficient emergency logistics management system

3.1 Technology Innovation and Application

First of all, modern information technology, such as the Internet of things, big data, artificial intelligence, etc., can be used to realize the intelligence and automation of natural disaster early warning, risk assessment, rescue material reserve, transportation and distribution, information management and other links. For example, the use of drones and robotics to improve the efficiency of the transportation and distribution of relief supplies. Secondly, through technological innovation, the development of new relief materials and equipment to meet the needs of different types of natural disasters [2].

3.2 Personnel training and education

Talent is the core resource of emergency logistics management system. In order to build an efficient emergency logistics management system, it is necessary to strengthen personnel training and education. First of all, establish a sound emergency logistics personnel training system, including professional curriculum, practical teaching, practical training, etc., to cultivate emergency logistics personnel with professional quality, practical ability and innovative spirit. Secondly, carry out emergency logistics training for government departments, rescue organizations, enterprises and other relevant personnel to improve their professional ability and sense of coordination in the process of natural disaster response. In addition, through holding special lectures, seminars and other activities, popularize the knowledge of emergency logistics, and raise the awareness and attention of the whole society to emergency logistics management.

3.3 Synergy and Cooperation Mechanism

Synergy and cooperation mechanism is the key to improve the efficiency of emergency logistics management system. First of all, establish a government-led emergency logistics management coordination mechanism with multi-departmental participation, clarify the responsibilities and division of labor of various departments in the process of natural disaster response, and ensure smooth information communication and efficient resource integration. Secondly, give full play to the role of social forces, form partnerships with enterprises, non-governmental organizations, volunteers, etc., participate in emergency logistics management, and improve the deployment and transportation efficiency of relief materials.

Conclusion:

In short, in the context of natural disasters, building an efficient emergency logistics management system is the key to improve the efficiency of rescue operations and reduce disaster losses. In the future, with the continuous development of science and technology and the deepening of international cooperation, we have reason to believe that natural disaster relief work will be carried out more quickly and efficiently, so as to make greater contributions to the safety of people's lives and property and social stability.

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