



The Impact of Improving Emergency Response Capability of Small and Medium-sized Airports on Civil Aviation Transportation Safety

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Abstract: Improving the emergency rescue capability of airports is a concrete embodiment of implementing the important instructions on "ensuring absolute safety in aviation operations and absolute safety for people's lives", as well as the deployment requirements on "improving the emergency command mechanism under the framework of major safety and major emergency response, and strengthening the grassroots emergency foundation and forces". Against this background, this paper first outlines the basic situation of the emergency response capability of small and medium-sized airports, analyzes the current status of their emergency response capability, and discusses the impact of improving emergency response capability on civil aviation passenger transport safety, so as to provide a reference for relevant research.

Keywords: small and medium-sized airports; emergency response capability; civil aviation passenger transport

1. Introduction

The International Civil Aviation Organization (ICAO) holds that civil aviation is an important infrastructure sector, and the safety and efficiency of air transportation are improved by relying on network technology. Therefore, civil aviation airports, airlines, air traffic control centers, suppliers and even passengers may be potential targets of cyber attacks, and cyber security capability is equally important as flight safety, business growth and innovation[1]. At present, small and medium-sized airports generally suffer from problems such as lagging hardware development, insufficient resource integration, inadequate safety management, and imperfect emergency management systems, which fail to meet the requirements of increasing passenger traffic and complex risk prevention and control. Against the background of major safety and major emergency response, improving the emergency response capability of small and medium-sized airports is an inevitable requirement for implementing the spirit of aviation safety instructions, and also an important measure to improve the passenger transport safety chain, ensure operational continuity and enhance resource coordination capability. Starting from the current status of emergency response capability of small and medium-sized airports, this paper systematically analyzes the impact of their emergency response capability on civil aviation passenger transport safety, providing theoretical references and practical ideas for the construction of airport emergency systems and the consolidation of passenger transport safety defenses.

2. Overview of Emergency Response Capability of Small and Medium-sized Airports

2.1 Basic Composition of Emergency Response Capability

In the civil aviation transportation network, small and medium-sized airports occupy an irreplaceable position, and the quality of the emergency management system directly affects passenger transport safety. The establishment of an efficient emergency system needs to take into account various factors such as emergency response mechanism, personnel training, material support, technical support and information communication. Small and medium-sized airports should establish a rapidly activated and pragmatic emergency disposal process to respond and standardize disposal in a timely manner when emergencies occur. Regularly organizing employees to receive training in professional knowledge and practical skills is one of the effective ways to improve on-site emergency disposal capacity, which can enhance the ability of personnel to cooperate and respond in critical moments. Material support should be equipped with fire-fighting equipment, first-aid devices, communication tools and other emergency supplies and equipment in accordance with various types of emergencies faced by the airport.

2.2 Relationship between Emergency Response Capability and Civil Aviation Passenger Transport

The emergency disposal capacity of small and medium-sized airports is closely related to and mutually promotes the level of civil aviation passenger transport safety. Improving emergency response capability can accelerate the airport's speed in responding to emergencies and reduce passenger transport delays, economic losses and travel safety risks caused by various emergencies[2]. For specific emergencies such as extreme weather and major facility failures, an efficient and complete

emergency response system can be activated quickly. Relying on pre-formulated plans and coordination mechanisms, the impact on the key chain of passenger travel can be minimized to ensure the continuity and safety of passenger travel. Furthermore, continuously improving emergency disposal methods is not only a response to the crisis itself, but also a way to improve the overall operational efficiency and resilience of the airport.

3. Current Status of Emergency Response Capability of Small and Medium-sized Airports

3.1 Hardware Meets Standards but Lags in Development

After the completion of new or reconstruction projects, the hardware facilities of airports generally meet the minimum requirements stipulated by the industry. However, the improvement speed of emergency response levels and comprehensive disposal capacity is always slower than the rapid growth of the actual operation scale and flight flow of the airport[3]. The mismatched development rhythm results in the phased compliance of hardware conditions not being timely and effectively transformed into a substantial improvement in emergency response and disposal efficiency, and hardware advantages cannot be exerted at critical moments.

3.2 Restricted Facility and Equipment Allocation

Small and medium-sized airports generally lack medical rescue capacity, with no independent first-aid capacity internally and mainly relying on external support. They cannot provide effective treatment for injured passengers in the first place when emergencies occur, becoming a short board in emergency rescue. Meanwhile, the capacity to remove disabled aircraft is seriously insufficient, with problems such as lack of professional equipment, unclear support agreements, missing transportation capacity evaluation, and low frequency of joint training. In addition, some airports have aging facilities and equipment, are located in mountainous or plateau areas with complex climatic conditions and high operational environment risks, which further increase the probability of emergencies and the difficulty of emergency rescue.

3.3 Obvious Gaps in Safety Management

At present, the proportion of unsafe incidents occurring at small and medium-sized airports in the total industry ratio is increasing. The incidence rate of bird strikes and aircraft operation incidents per 10,000 flights in their management responsibility areas is much higher than that of large hub airports and the national industry average. The incidence rate of high-severity unsafe incidents such as runway incursions and ground vehicle conflicts is more obvious in the operating environment of small and medium-sized airports, indicating that these airports have weak links in key risk prevention and control, which directly threaten passenger travel safety.

3.4 Shortcomings in the Emergency System

There are obvious structural problems in the current emergency system, namely incomplete types or insufficient quantities of emergency facilities and equipment, imperfect construction of professional emergency talent teams, and insufficient solid and in-depth construction of grassroots, foundation and basic skills. Issues such as the effect and quality of emergency drills, the scientificity and rationality of emergency plans, on-site operability, and the effectiveness of emergency coordination and linkage mechanisms among multiple departments must be improved through a series of corrective measures.

4. Analysis of the Impact of Improving Emergency Response Capability on Civil Aviation Passenger Transport Safety

4.1 Directly Reducing Accident Losses and Improving Survival Rate of Onboard Personnel

Emergency response capacity building is an important part of civil aviation passenger transport safety support. In the event of sudden accidents, it can effectively reduce casualties and property losses and improve the survival rate of onboard personnel. Scientific and standardized emergency rescue measures and efficient and sensitive response mechanisms promote and restrict each other, forming the foundation for ensuring personnel survival and greatly reducing the harm of accidents. Improving the allocation level of software and hardware for airport emergency rescue can significantly reduce the casualty and disability rate. By means of equipping advanced life-saving equipment, improving emergency rescue procedures, and perfecting the airport safety support system, a solid defense line against extreme dangers is built. Rapidly responsive fire rescue and medical rescue in aircraft emergencies can win valuable time for rescue, and standardized airport emergency rescue channels allow rescue forces to arrive quickly and passengers to evacuate in an orderly manner.

4.2 Enhancing Passengers' Awareness of Self-rescue and Mutual Rescue and Improving the Full-staff Emergency Protection System

The safety of civil aviation passenger transport cannot rely solely on the strength of professional personnel and key positions. Passengers' own safety awareness and emergency disposal capacity are also very important. Strengthening the cultivation of passengers' awareness and skills of self-rescue and mutual rescue can shape a full-staff emergency protection system, accelerate emergency disposal speed and reduce accident casualties. Normalized aviation safety publicity and emergency training are the main ways to improve passengers' self-rescue and mutual rescue capacity, which can greatly enhance passengers' familiarity and implementation of safety procedures and emergency processes. Passengers who can skillfully use seat belts, correctly identify emergency exits and operate emergency equipment in a standardized manner will have a greatly increased survival probability. In the event of an emergency aircraft landing, passengers who have received systematic training can cooperate with flight attendants to guide rapid evacuation, effectively avoiding congestion and stampedes and buying time for escape.

4.3 Perfecting the Emergency Management System and Making up for Shortcomings in Passenger Transport Safety

Improving emergency disposal capacity can quickly respond to various sudden safety incidents, perfect the civil aviation passenger transport safety management system, make up for loopholes in safety prevention and control, transform safety management from "passive response" to "active prevention", and improve the level of safety management. Technically, advanced navigation, emergency communication, intelligent monitoring and other equipment are adopted to realize the intelligent and precise emergency disposal. Intelligent monitoring can early warn of potential safety hazards, and the optimized emergency communication system ensures efficient coordination and linkage of emergency forces. Institutionally, promote the standardization of emergency procedures, formulate unified and standardized disposal processes and operating standards, clarify the responsibility boundaries of each post, put an end to problems such as buck-passing and non-standard operations, improve the efficiency and quality of emergency disposal, and provide a strong guarantee for civil aviation passenger transport safety from both technical and institutional aspects.

4.4 Ensuring Smooth Passenger Travel and Improving the Quality of Civil Aviation Passenger Transport Services

The improvement of emergency response capability can quickly deal with common emergencies such as flight delays, equipment failures and sudden passenger illnesses, shorten passengers' stay time at the airport and reduce bad experiences. Efficient emergency disposal and information notification mechanisms enable passengers to understand flight status and handling processes in a timely manner, enhance passengers' travel sense of security and satisfaction, and help continuously improve the quality of civil aviation passenger transport services.

5. Conclusion

To sum up, under the background of globalization, civil aviation transportation is an important part of public travel and transportation services, and its safe and efficient operation has attracted public attention. As important nodes of the entire aviation network, the capability of small and medium-sized airports to respond to emergencies is directly related to the safety and efficiency of passenger transport. Improving the emergency response capability of small and medium-sized airports is the main way to consolidate the defense line of civil aviation passenger transport safety. Making up for the shortcomings in facilities, processes and personnel can make the safety chain more reliable, system recovery more resilient, cross-departmental coordination and linkage more effective, reduce accident risks at the source, and ensure safe and smooth passenger travel. Continuously improving the emergency management system, promoting resource integration and enhancing emergency disposal capacity will create conditions for building a safe and efficient civil aviation passenger transport network.

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