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Discussion on the Framework of Crisis Leadership Model of Civil Aviation Operation Units

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Abstract: *Leaders, as the top managers of crisis events, play the vital role in the crisis events management. The leaders of civil aviation operation units are a special group, which are leading to the operation safety of the civil aviation transportation industry, and effectively responding to various crises as well. This paper constructs a crisis leadership model for civil aviation operation units, and on this basis, conducts an empirical study on 167 senior executives of civil aviation operation units in China. The research results show that the leaders of civil aviation operation units in China are facing a complex circumstance both outside and inside the organization, and shortage of information transmission, communication and coordination, and professional support during the response to various crisis events. The crisis leadership model in this paper provides a theoretical basis for civil aviation operation unit leaders to establish crisis response capabilities, and its empirical results provide data support for a more comprehensive understanding of the status quo of civil aviation operation unit leaders.*

Keywords: *Civil Aviation Operation Units; Crisis Leadership Model; Emergency Management*

1. Introduction

Leaders, as the managers of crisis events, play the vital role in the crisis events management. With the continuous increase of civil aviation traffic, all kinds of risks faced by civil aviation are increasing, which will require civil aviation leaders to have appropriate crisis leadership capabilities.

The research on crisis leadership is scattered and in some literatures, most of which focus more on the research of corporate crisis management. Management scholar Robert Heath (2003) [1] emphasized in his book “Crisis Management” that business leaders should attach great importance to and directly participate in crisis events, and pointed out that business leaders should have a clear understanding of the organization in crisis, it is necessary to express a high degree self-confidence to stabilize the internal atmosphere in front of subordinates, quickly make effective decisions, minimize the loss of the enterprise, and learn from the crisis, and strengthen the ability of the enterprise to respond to the crisis while doing a good job in the restoration of the enterprise. Guan Zheng et al. (2017) [2] proposed ten key elements of crisis leadership based on the four stages of "prevention and preparation", "monitoring and early warning", "emergency response and rescue", and "recovery and reconstruction". Xue Yingxu (2019) [3] analyzes leaders' crisis problems and coping strategies through case studies. Leonard Marcus et al. (2020) [4] put forward three meta-leadership abilities that leaders should possess in a crisis, namely, personal, contextual, and interoperability.

This article takes the civil aviation operation unit as the research object. The civil aviation operation unit refers to the organization which directly participates in the production operation and management in the civil aviation industry, including transportation airports, transportation airlines, air traffic control units, aviation fuel units, etc. Based on the characteristics of the civil aviation operation unit, this article gives the definition of the crisis leadership of the civil aviation operation unit as: the capacities of the civil aviation operation unit leader, who can accurately foresee crisis events, or has the comprehensive and in-depth situational awareness of the crisis event, effective decision-making and coordination of multiunit resources during the response stage, lead the organization to respond quickly and recover as soon as possible, and improve the ability of organizational resilience after learning from the crisis events. This paper establishes a crisis leadership model for civil aviation operation units, and conducts empirical

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investigations among 167 senior executives of the civil aviation industry in China, and makes an attempt to further understand the current situation of crisis leadership to those leader.

2. The Crisis Leadership Model of Civil Aviation Operation Units

2.1 Crisis Leadership Characteristics

Since civil air transportation is a commercial operation industry with a public service nature, the leaders of civil aviation operation units have relatively special responsibilities and requirements, mainly as follows:

(1) Strong public safety awareness. The main service targets of civil aviation operation units are the general public and traveling passengers. Its civil aircrafts, terminal buildings and other facilities are relatively densely populated. Once an emergency occurs, the social impact will be huge. Therefore, the leaders need to have highly sensitive to public safety awareness.

(2) High agility in crisis response. As the life and property safety of the public or passengers is involved, civil aviation operation units have very high requirements for response to emergencies, especially for operational safety incidents. The emergency response efficiency is often calculated in seconds.

(3) Difficulty in communication and coordination. In the case of civil air transportation, it is often difficult for a single unit to deal with emergencies on its own. Instead, it requires the participation or assistance of relevant external units and the need to keep in touch with local governments and relevant departments at any time. Even if the unit can deal with it by itself, it still need to establish a smooth coordination mechanism among multiple internal departments.

(4) High professional requirements. Civil aviation transportation involves many professional fields, including flight technology knowledge, air traffic control knowledge, and transportation law knowledge, which put forward higher requirements for leaders' decision-making and judgment in a crisis event.

2.2 Crisis Leadership Model Framework

Liu Chongrui (2010) [5] proposed a crisis leadership element model, including crisis prediction, crisis identification, crisis response, crisis recovery, and crisis learning. Chen Xiaoping and Xiao Mingzheng (2011) [6] proposed five crisis management leadership models, including crisis signal detection ability, crisis prevention and preparedness ability, crisis damage control and containment ability, business recovery ability, learning and thinking ability.

This article divides the entire phase of emergency management into four phases: before the crisis, on the crisis, during the crisis, and after the crisis. There are separately goals and tasks during each phase. Based on the views of Zhong Kaibin (2020) [7] "Twelve Lectures on Emergency Management", the paper proposed the 12 core competence elements of crisis leadership, which constitute the framework model of crisis leadership of civil aviation operation units, as shown in Table 1.

Table 1: Crisis leadership model framework of civil aviation operation units

Event phase	Key tasks	Core capacities
Before the crisis	Prevent it from happening, be prepared for the uncertainty	risk prevention
		risk control
		emergency preparedness
		monitoring and early warning
Initial phase of the crisis	Anti-sluggishness, quick response	information transfer
		situation awareness
		advance response
During the crisis	Prevent expansion and control the situation	decision making and command control
		communication and coordination
		media communication and guide
After the crisis	Anti-rebound, reshape the resilience	fast recovery
		investigative and learning

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3. Empirical Analysis

3.1 Research Backgroud

In this paper, an online questionnaire was used to investigate and research 167 leaders of various civil aviation operation units in China. The leaders in this article refer to the leadership of the operating unit that have the right to make decisions about operation or management, such as the chairman, (vice) president, (deputy) general manager, chief pilot, chief engineer, safety director, Operation (Vice) President, Labor Union Chairman, Chief Financial Officer, Secretary of Disciplinary Committee and other unit leaders.

The survey objects mainly involve domestic transportation airports, transportation airlines, general airlines, aviation fuel units, aircraft maintenance units and many other units. The distribution is shown in Table 2. From the perspective of research units, the largest objects are from transportation airports, with 61 leaders, accounting for 36.52% of the total number, followed by transportation airlines, with 48 people, accounting for 28.74% of the total number.

Table 2: Distribution of the survey subjects

Type of operation unit	objects number
transportation airports	61
aviation fuel units	14
transportation airlines	48
general airlines	21
aircraft maintenance units	8
Other units	15
Total number	167

The online questionnaire mainly involved five questions, including professional background, years of civil aviation experience, duty pattern, types of crises experienced, and crisis response difficulties (as shown in Table 3). A total of 102 questionnaires were effectively returned, with an effective rate of 61%.

Table 3: Question list of the online questionnaire

Serial number	Questions
1	Is your professional background related to civil aviation
2	How many years have you worked in civil aviation
3	What is your organization's leader-on-duty model
4	What were the special situations (crisis events) you face during the daily shift in the past years
5	What are the main difficulties you face when dealing with those crisis events

3.2 Analysis Results

The analysis results of the online survey are as follows:

1) Professional background

Among the survey respondents, there are 80 leaders with professional backgrounds related to civil aviation, and 22 executives with non-civil aviation professional backgrounds, accounting for 78.43% and 21.57% of the total number respectively.

2) Working years

Among the survey respondents, there are 5 people who have been in the civil aviation industry for less than 5 years, 5 people for 5 years (inclusive) to 10 years, 25 people for 10 years (inclusive) to 20 years, and 48 people for 20 years (inclusive) to 30 years, and 19 people for 30 years (inclusive) and above, as shown in Figure 1. It can be seen that most of the leaders of civil aviation operation units have worked in the industry for more than 10 years (90.20%), and the most common experience is between 20-30 years, accounting for nearly half (47.06%).

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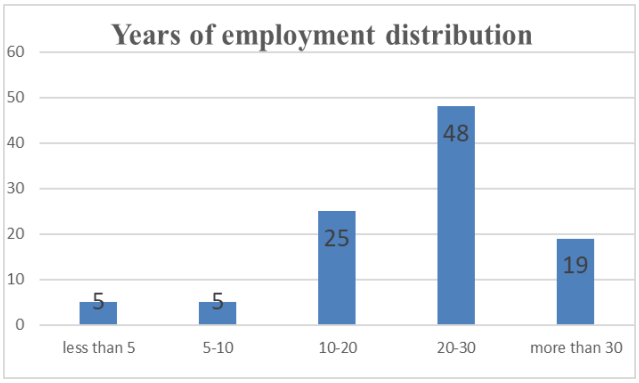

Figure 1: Example of a figure caption

3) Duty pattern

The leader-on-duty model reflects how the unit leaders and personnel at all levels play a role when the crisis is approaching in different operating units. Table 4 shows the duty leadership model of the operating unit.

Table 4: Operating unit leader duty mode statistics table

Duty pattern	Number	Percentage
Company executives shift	43	42.16%
Company executives and all department leaders work in shifts	32	31.37%
Company executives and operation department leaders work together in shifts	15	14.70%
Company executives and the general duty office work together in shifts	8	7.84%
Company executives and on-duty leaders of the operation control department work together in shifts	2	1.96%
Other pattern	2	1.96%

It can be seen from the Table 4 that the company's executive shifts are the most common, accounting for 42.16% of all survey respondents, followed by company executives working in shifts with all department leaders 31.37%.

4) Crisis event scenario

This survey is based on the classification of emergencies in the "Emergency Response Law of the People's Republic of China", in which the emergency events divide into natural disasters, accident disasters, public health, and social security. Baes on the country law and the civil aviation regulations in China, the paper divide the crisis events that civil aviation operation units may encounter in daily life into 6 types, including catastrophic weather events, aircraft flight safety incidents, ground operational safety incidents, air defense safety incidents, operation interruption incidents, and rescue tasks required by superiors. 33 crisis event scenarios were finally formed under 6 type of crisis events. Figure 2 shows the statistical results of crisis event scenarios that the survey subjects have actually encountered.

It can be seen from Figure 2 that among the top ten crisis event scenarios, bird strikes are the most common scenario. Disastrous weather events scenarios such as thunder and lightning, heavy fog, heavy rain, ice and snow, account for four in the top ten scenarios.

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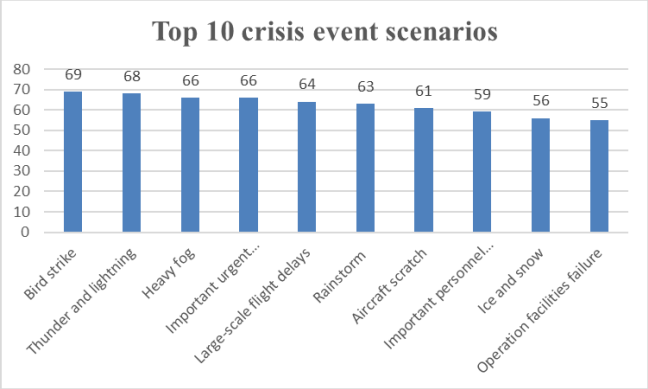

Figure 2: Top 10 crisis event scenarios the respondent experienced

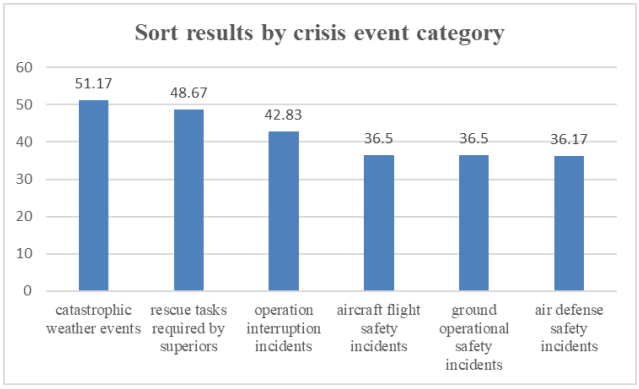

Figure 3: Sort results by crisis event category

It can be seen from Figure 3 that among the various crisis events encountered by those survey respondents, catastrophic weather events are the most experienced type, with about 51 people chose. The following sequence is: the rescue tasks required by the superior, the operation interruption incidents, the aviation flight safety incident, the ground operational safety incident, and the air defense safety incident.

5) Crisis response difficulties

This survey selected 6 major crisis management challenges to investigate among the survey respondents. As shown in Table 5.

Table 5: Statistical table of crisis management challenges

Serial number	Challenges when facing the crisis events	Number	Percentage
1	Situation information is highly uncertain or not timely	62	60.78%
2	Difficulty in communication and coordination with related units	50	49.02%
3	Lack of relevant professional technical support	27	26.47%
4	Inconsistent opinions of various professional departments, making coordination and decision-making difficult	23	22.55%
5	Too many requests from superiors and they do not meet the actual disposal situation	22	21.57%
6	No regulatory basis or conflicts with the provisions of the regulations	18	17.65%
7	others	12	11.76%

It can be seen from Table 5 that the challenge of obtaining information during a crisis is the biggest problem faced by the survey respondents, and those who choose this option account for 60.78% of all personnel. The second is the issue of effective communication between departments, with 49.02% of those in difficulty.

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4. Research Conclusions and Prospects

The research results from the 102 questionnaires fed back by the leaders of civil aviation operation units in China, show the comprehensive understanding of the current crisis leadership status of the civil aviation industry in China. There are three opinions from the empirical analysis results, which are shown as follows.

1) Leader characteristics

The survey results show that most of the leaders have professional background in civil aviation (80 people, 78.43%), and 67 people (65.69%) have more than 20 years of experience in civil aviation industry. The survey results also show that the current leader team of civil aviation operation units is highly professional, and the team composition is relatively balanced, which provides a basis for better responding to various crisis events.

Moreover, in the survey of duty pattern, it can be seen that the two most important duty systems are the company executives shift pattern and the company executives and all department leaders work in shifts pattern. As a result, the operating units are still facing certain risks, that is, when a crisis event comes, the on-duty team cannot handle the complex situation for their insufficient experience and professional skills, which results in a late response to the crisis event, invalid decision-making and other issues.

2) Crisis characteristics

The survey results show that catastrophic weather events are the most common crisis scenario and also the most passive one. Due to the influence of the geographical environment and the operating environment, different operating units develop rich experience to handle the catastrophic weather crisis scenario.

Some crisis scenarios are directly related to operations, including aircraft flight safety incidents, ground operational safety incidents, operation interruption incidents. However, the probability of occurrence of operation interruption events is greater, which is the type of event that has gradually attracted attention from civil aviation operations units in recent years. However, this type of crisis scenario is very complex and is the most difficult situation to deal with compared with all crisis scenarios.

3) Challenge characteristics

The survey results show that there are two major challenges in dealing with crisis events, one is the problem of information flow, other is the communication and coordination issue. There are many reasons for these problems, including lack of organizational structure and emergency responsibilities, poor emergency planning design, weak technical tools, and so on. Therefore, it is necessary to have a more comprehensive understanding of the status quo of emergency management of operating units and propose solutions in a targeted manner.

In summary, based on the establishment of a crisis leadership framework for civil aviation operation units, this article has carried out a preliminary study on the role of leaders of the operation units. The research results of this article help to understand the current situation of crisis leadership of the leaders of operating units more accurately and comprehensively, and lay the foundation for further in-depth research in the follow-up.

Acknowledgments

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