

Research on Cause and Governance Path of Passenger Disturbance in Flight Delay in Terminal

Yunyan GU, Jianhua YANG

Department of Automation Control, Northwestern Polytechnical University, P.R.China,
24990696@qq.com

Abstract Civil aviation flight delays disposal is always a tricky problem in the civil aviation. Analysis of the causes of passenger disturbance is of great significance to improve civil aviation service level and spot management capability in flight delay. Taking Shenzhen airport as an example, the 2016-2017 flight delay data in Shenzhen Airport is analyzed. The main factors that cause passengers disturbance are analyzed, which include the lengths of flight delay time, the flight departure time in schedule, current time of flight delay, crowd density of boarding gate, service quality of airline service and management ability. According to the management characteristics of the terminal building, the solution to the problem of passenger disturbance is proposed, which is good for civil aviation staff to do well in flight delay.

Key words Air transportation; Great amount of flight delay; Influence factor; Governance path; Disruptive behavior

1 Introduction

Passenger disruption in flight delays is always an important factor in reducing the level of civil aviation services. It is a long-term and arduous task for civil aviation workers to deal with the passengers disruptive behavior reasonably. Taking Shenzhen airport as an example, amount of flight delay occurs more than 18 times each year, due to weather, flow control and other reasons. Thousands of flights are delayed. Because of the lack of systematic analysis of the causes of disruptive behavior, not timely and effective suppression of the occurrence of disruptive behavior, the means of disposal of disruptive behavior is often in a passive state, and civil aviation workers have spent a large amount of manpower and material resources to deal with the impact of disruptive behavior. Many factors cause passenger disturbance. The current research on the causes of passenger disruption is only from the factor of the number of passengers gathered, which can not meet the practical application needs. It is an important issue for civil aviation to analyze systematically the causes of passenger disrupting behavior and formulate measures to improve safety and service levels.

At present, most of the research on the cause of disturbance in terminal buildings is analyzed from the behavioral science, psychology and the number of passengers in terminal buildings^[1,2]. There are few studies on the management characteristics of the terminal. These studies have some limitations on the management of the terminal. According to field management experience of the terminal and the management characteristics of the terminal, the reasons of passenger disturbance are analyzed in many aspects. The key factors causing the disturbance of the terminal passenger are analyzed, and the solutions are proposed in order to provide some ideas and methods for the civil aviation staff to carry out the follow-up guarantee.

2 Passenger disturbance in terminal

2.1 Great Amount of Flight Delay

There are different levels of response mechanism for flight delays, which are called yellow, orange and red.^[3]

Yellow: Fewer than 50% scheduled flights are not taking off in the rush hour(08:00-23:00),which is delayed more than 2 hours or the percentage of non-departure flights in schedule is more than 5% ,which are delayed more than 1 hour .

Orange: Fewer than 50% scheduled flights are not taking off in the rush hour(08:00-23:00),which are delayed more than 3 hours or the percentage of non-departure flights in schedule is more than 7.5% ,which are delayed more than 1 hour .

Red: Fewer than 50% scheduled flights are not taking off in the rush hour(08:00-23:00),which are delayed more than 4 hours or the percentage of non-departure flights in schedule is more than 10% ,which are delayed more than 1 hour .

2.2 Passenger disturbance in terminal

The passenger disturbance includes:

- (1) intentionally damage or move facilities and equipment in Airport without permission.
- (2)blockade,seize, or attack the gates,include boarding gate, access control gate, ticket counter ,security check channel , security inspection channel, boarding counter, check-in counter, integrated service counter.
- (3) Fight, or pick a quarrel and make trouble, or come into physical contact with staff.
- (4) hinder the staff to perform their duties or incite the passengers to prevent the staff from performing their duties.
- (5) forcibly enter the aircraft, control area or other control place.
- (6)other acts that affect flight support or disrupt normal public order.

3. Analysis of the cause of Passenger disturbance

There are many reasons for passenger disturbance in terminal when amount of flight delay occurs at the airport. According to the management characteristics of the terminal, The direct causes of the passenger disturbance in Shenzhen Airport terminal in 2017 are investigated. There are many reasons for causing passenger disturbance in terminal. Based on the management characteristics of the terminal, the main reasons for the disturbance are analyzed.

3.1 The lengths of flight delay time

The longer the flights delay, the higher the probability of passenger disturbance is. The data of the flights delay and passenger disturbance in Shenzhen airport in 2017 is analyzed in Table 1. As shown in table 1, there are 160 events of passenger disturbance in Shenzhen airport in 2017. The probability of passenger

disturbance is different in different delay times. When the flights are delayed for more than 4 hours, the passenger disturbance rate is 45.625%, and maximum number of times is 73 times.

When the flight is delayed longer, the mood of the passengers is more intense. With the increase of the delay time, the more likely the passengers are to make trouble.

Table1 Statistics of flight delays and passenger disturbance at Shenzhen airport in 2017

Serial number	Flight delay time(hours)	The number of passenger	
		disturbance	proportion
1	0-1	23	14.375
2	1-2	12	7.5
3	2-3	17	10.625
4	3-4	35	21.875
5	4 hours and above	73	45.625

3.2 The flight departure time in schedule

The scheduled departure date is of great significance to many passengers. The data of the flight departure time in schedule and passenger disturbance in Shenzhen airport in 2017 is analyzed in Table 2. There are 250 days of legal work day in one year in China, and 115 days are rest days and holidays.

As shown in table 2, it can be seen that the departure date of the flight plan is more likely to cause the disturbance of passengers' mood and disturbance before the holidays or on holidays.

Table2 Departure date and disturbance statistics for delayed flights scheduled at Shenzhen airport in 2017

Serial number	Flight departure time in schedule	The number of passenger	
		disturbance	proportion
1	Working day (Monday to Friday)	80	14.375
2	weekends, and holidays	35	7.5
3	weekends, and holidays	45	10.625

3.3 Current time of flight delay

The probability of the occurrence of passenger disturbance is different because of different current time of flight delay. The data of different time of the occurrence of passenger disturbance in Shenzhen airport in 2017 is analyzed in Table 3. As shown in table 3, passenger disturbance mainly occurs at the time of meal (10 -14, 18 o'clock -22) and evening rest (after 22 o'clock). The passengers are more anxious at night due to flight delays. Passengers worry that the airlines can not satisfy the requirement of transportation and accommodation. Anxiety can more likely lead to passenger disturbance.

Table3 Statistics of current time of flight delays and passenger disturbance at Shenzhen airport in 2017

Serial number	Current time of flight delay(24-hour)	The number of passenger	
		disturbance	proportion
1	06-10	14	8.75

Table 3, cont.

2	10-14	28	17.5
3	14-18	19	11.875
4	18-22	44	27.5
5	22-02	45	28.125
6	02-06	10	6.25

3.4 Crowd density of boarding gate

When a large number of flights are delayed, several flights are assigned to the same boarding gate because of resource shortage of boarding gate, so crowd density of each boarding gate is different. The density of passengers is different, and the probability of causing passenger disturbance is different. The data of flight number and passenger disturbance at the boarding gate is analyzed in Table 4. As shown in Table 4, the higher the density of passengers is, the higher probability of disturbance would be. In actual work, when a large number of flights are delayed, it is less common that 7 or more flights are allocated at the same boarding gate.

**Table4 Statistics on the number of flights and passenger disturbance
at boarding gate at Shenzhen airport in 2017**

Serial number	The number of flights at boarding gate	The number of passenger disturbance	Proportion
1	1-2	28	17.5
2	3-4	38	23.75
3	5-6	40	25
4	7and above	15	9.375

3.5 Service quality of airline service

The service quality of airline is different, and the probability of disturbance is different. The data of checking the attendance status of the main service company and passenger disturbance is analyzed in Table 5. As shown in Table 5, the service level of the ground service company has a direct relationship with the disturbing behavior of the passengers. It is of great significance for reducing the incidence of passenger disturbance to help the passengers to deal with the sudden cases and reduce the anxiety of passengers when the flights are delayed.

**Table5 Statistics on the number of flights and the number of passenger disturbance
at boarding gate at Shenzhen airport in 2017**

Serial number	The main service company	The number of post checks	Number of no service personnel	Proportion	The number of passenger disturbance
1	A service company	36	8	22.22222222	41
2	B service company	48	13	27.08333333	59
3	C service company	35	0	0	17

3.6 Management ability

when a large number of the flights are delayed, it is shown that the information transmission channel is impeded and emergency supplies are lacking. In response to the rapid increase in the number of passengers in the terminal, the guarantee work is often passive.

4. The government path of passenger disturbance in terminal

The main causes of passenger disturbance in terminal are analyzed when the flights are delayed. It is a systematic project to solve this problem. Any subsystem going wrong will affect passengers' emotional agitation, causing passenger disturbance. Therefore, in order to reduce or stop the occurrence of passengers disruptive behavior, we need to solve it in many ways.

4.1 Increase the rate of flight punctuality

In order to establish the government path of passenger disturbance in terminal, it is necessary to set up the system and establish mechanism from the overall situation. All the units should be highly conscious of ensuring the normal flight, formulating the reasonable mechanism of flight delay, in order to increase the rate of flight punctuality by mechanism^[4].

4.2 Making reasonable Standard of emergency plan for passengers detained in terminal

When a large number of the flights are delayed in terminal, it is of great significance for management and control of the detained passenger in the terminal to make reasonable standard of emergency plan for passengers detained in terminal. A reasonable emergency plan should be made with the management characteristics of the terminal. It is beneficial to reduce the probability of passenger disturbance and strengthen the safety management of the terminal building. It is of great significance to improve the service level.

4.3 Establishment of early-warning model of passenger disturbance in flight delay

In view of the analysis of the cause of passenger disturbance when the flights are delayed, the effective early warning model of passenger disturbance in the terminal should be established by using the data mining technology. When a large number of the flights are delayed, the early warning model can not only predict passenger disturbance more accurately, but also provide effective and positive handling measures.

4.4 Providing accurate service from the needs of passengers

The service standard of the civil aviation enterprise is basically based on the operation needs, and it is the understanding of the enterprise itself. There is a gap between such service standards and customer expectations. The way to narrow this gap is to develop service standards from customer expectations. Enterprise oriented service standard is the service standard required by the company's productivity, effective cost and technical quality. Such service standards represent the goals and needs of enterprises, and the

objectives of enterprises do not necessarily represent customers' expectations or requirements. The services provided by such standards may not always meet the needs of customers, or only meet the part needs of customers. Only when the goal of the enterprise is exactly the same with the customer's expectations or requirements, will the customer make a high evaluation of the service ^[4].

4.5 Strengthening lawful and propaganda concepts

Strengthen legal promulgation and education to enhance the legal awareness and idea of the public. We should stop the passengers from making trouble by law when the flights are delayed, to effectively safeguard the normal order of the airport.

5. Conclusion

Through the analysis of the related data about passenger disturbance in the terminal, The main factors that cause passengers disruptive are analyzed, which include the lengths of flight delay time, the flight departure time in schedule,current time of flight delay, crowd density of boarding gate, service quality of airline service and management ability. The relevant measures are proposed to reduce passenger disturbance, and provide some ideas and methods for flight delay disposal. At the same time, when a large number of flights are delayed , the causes of passenger disturbance in the terminal are very complex. The passenger disturbance caused by the passenger's physical cause is not considered , and further research on the cause of the disturbance will be combined with the causal factors such as the passenger's physical cause.

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