Study on Supervision of Airport Apron Operation in Civil Airport

Guangzhan Wang [1, a], Xinjiang Xu[1, b], Xiaolei Zhang[1, c] and Zhenzhen Sun[2, d]

[1]Scholl of Binzhou University, Binzhou 256600, China

[2]Scholl of Qingdao Institute of Technology,Jiaozhou 266300,China

[a]772787900@qq.com, [b]1940355163@qq.com, [c]2250152107@qq.com [d]2470666493@qq.com

Abstract

The purpose of this paper is to study the operation supervision of civil airport apron and put forward improvement measures and methods.In the process of research, literature method and empirical method are mainly used. According to the purpose of the research, relevant books and papers are consulted through libraries and the Internet to provide theoretical support for paper writing.This paper briefly introduces the current situation of airport supervision at home and abroad, systematically expounds the main types, design requirements and working characteristics of airport apron, and analyses the common problems and causes of apron accidents, confusion of vehicle and equipment management, urgent standardization of flight support operation, imperfect apron management rules and so on in airport apron supervision, and sums up them pertinently.In order to ensure the safety of the airport apron operation and improve the operation efficiency on the basis of ensuring the safety of the apron, some countermeasures are put forward, such as strengthening the apron supervision, standardizing the flight guarantee operation, perfecting the apron management rules, improving the operation efficiency and improving the apron monitoring means.

Keywords

Apron management; safety; efficiency; apron; suggestions.

1. Introduction

The apron system is a complex system. Its safe operation consists of the safe operation of apron facilities and equipment, and the operation safety of apron guarantees personnel.

Once aircraft damage occurs, it will not only cause high maintenance costs, but also cause a series of problems such as flight delays.Bad weather conditions also greatly reduce the throughput of the airport, and even lead to the closure of the airport.According to statistics, about two-fifths of air accidents and 50% of flight delays are caused by weather, as well as flight delays caused by the impact of personnel and service vehicles operating on the apron.Therefore, under the premise of ensuring the safety level, we must improve the efficiency of the apron operation.

2. Analysis of Common Problems and Causes of Apron Operation

Airports, regardless of size, usually consist of two parts: the flight area and the terminal area.The flight area usually includes runway, taxiway, apron (or hangar) and airport clearance. The terminal area usually includes terminal building, freight building, parking lot (building), air traffic control building, oil depot and work area.The apron management is difficult and risky because of its many operating units, types of work, vehicles, personnel and cross-operation.With the rapid development of airports, especially aircraft take-off and landing sorties and throughput, the problems of apron operation management are constantly exposed.

2.1 Hidden Danger of Apron Accident

Apron accident, the domestic industry name is an aviation ground accident occurring on the apron, which is one of the main problems affecting civil aviation safety.There are many reasons for the apron accident, even if the same kind of accident, there are many reasons, such as the collision between the

apron aircraft and the aircraft, there are many reasons, such as improper ground command, improper judgment of the crew, improper parking of the aircraft, improper observation of the crew, improper operation of the aircraft, the impact of the aircraft wake jet and so on.

According to the statistics of the International Airport Association, the incidence of apron accidents of every 10,000 sorties in the world is 3.27. Among them, the accident rate of damage caused by ground equipment to parked aircraft is 0.9 per 10,000 sorties, 0.33 per 10,000 sorties in moving aircraft, 0.07 per 10,000 sorties caused by aircraft wake jet, and the accident rate of damage to the apron is 0.33 per 10,000 sorties.The accident rate of damage to apron equipment was 1.49 per 10,000 sorties, and 0.48 per 10,000 sorties.

2.2 Flight Support Operations are not Standardized

The main manifestations of non-standard management of flight support operations are as follows:

(1) Guarantees and vehicles left newspapers, garbage, packages and other items on the apron pavement during their operations, which were not cleaned up in time, and may have caused airplane injury or flight delays when specialized departments cleaned up.

(2) To ensure that vehicles occupy parking spaces at apron entrances and exits and other vehicles while waiting by the apron, thus affecting the normal running of other vehicles.

(3) Guarantee that vehicles do not enter their parking spaces near the apron in advance and stand by. After landing, the aircraft rushes to approach the aircraft in order to catch time, which results in the speed exceeding the speed limit of the vehicles in the interior of the airport and affects safety.

(4) When approaching the aircraft, individual vehicles with lifting devices do not operate according to the principles of lifting first, approaching first and evacuating first and then dropping down, which results in potential safety hazards.

2.3 Rules of Apron Supervision are Imperfect

Rules of apron supervision provide a relatively complete code of conduct and regulatory basis for apron operation, and are the guidelines that must be followed by aircraft, vehicle equipment and staff in apron production activities.

In practical work, some clauses of the rules lay emphasis on principles and norms, but the subdivision is insufficient.There is no specific scope, requirement and method for how to exercise these functions and powers. It stipulates empty concepts and does not have operability.There are also some standards that are not clear enough to quantify operations.

3. Measures to Optimize the Supervision of Aperture Operation

3.1 Strengthen Apron Supervision

(1) Improve all kinds of facilities and equipment in the apron, and carry out regular maintenance, such as the stop line of the apron's position, the taxiway line of the aircraft, the fire fighting equipment on the apron, the lighting equipment on the apron, the vehicle's running line and the parking area of the vehicle's equipment.

(2) Establishing a special coordinating body.Establish apron safety committee and hold monthly meetings to study apron management issues, formulate apron management standards and systems, and deal with apron accidents.

(3) To improve the traffic order of apron vehicles by means of combining supervision and unscheduled patrol when flights are dense, focusing on dealing with violations of regulations such as speeding, no warning lights, not following the prescribed routes, random parking and not placing wheels on the apron, and giving warning or punishment to those who violate the regulations.

(4) Strengthen the education of flight support operators and compile training textbooks such as "Apron Management Manual" and "Flight Area Driving Manual".

3.2 Standardizing Flight Operations

(1) Standardize all kinds of marking on the apron.Those who do not conform to its provisions shall be amended, perfected and supplemented.Vehicle marking and aircraft taxiing marking should play a non-contradictory guiding role.

(2) Guarantee vehicles shall enter their respective parking spaces beside the apron in advance, and shall not occupy parking spaces at apron entrances and exits and other vehicles while waiting at the apron.

(3) Drivers without an interior driving license shall not be on duty, and vehicles without an interior driving license shall not enter the apron restricted area without the approval of the command center.

3.3 Improving Regulation Rules

Perfect and revise the rules according to the actual situation of airports and posts.Emphasis is laid on solving the problem of lack of operability of the rules. Details of the principled norms, concretization of the conceptual provisions and clarification of the vague provisions are made.Increase the incentive strength in the apron supervision rules, maximize the incentive role of incentives, and mobilize the enthusiasm of employees to participate in apron management.

3.4 Improving Operating Efficiency

Airport unified command is one of the main means to shorten the time of aircraft taxiing on the ground.This can not only better combine aircraft taxiing routes with seat allocation, promote the development of zoning operation mode, but also balance aircraft taxiing and vehicle traffic demand, and solve traffic congestion problems.

For airports with low visibility and more weather, the management of taxiway intersection roads and traffic control schemes should be well done.In short, airports should pay more attention to special operations in accordance with the actual situation in the region.

3.5 Improving monitoring means

Video technology, as a common and cheaper device, can also provide non-cooperative surveillance potential. Because of its versatility and inexpensiveness, video cameras can be deployed in large quantities to cover restricted areas of the scene surveillance radar.Therefore, video surveillance can be used as an alternative to non-cooperative surveillance methods such as apron surveillance radar.At the same time, considering the rapid development of automatic Dependent Surveillance Broadcast (ADS-B) technology, video as a non-cooperative surveillance means and ADS-B as a cooperative surveillance means, the integration of these two data may even provide a surveillance scheme for future aprons.

4. Conclusion

Airport apron operation supervision is one of the important basic links in the process of airport safeguard operation.At present, airport business is developing very rapidly. The rapid growth of passenger throughput, cargo and postal throughput and flight take-off and landing sorties has increased the difficulty of apron operation supervision.This paper focuses on the analysis of the problems and shortcomings of airport apron operation supervision, and puts forward optimization countermeasures and suggestions.Airport apron operation supervision needs long-term practice, continuous accumulation and summary, and constantly put experience into practice to test.It is believed that with the continuous growth of technology and economy, it will be better to ensure the safety, economy and efficiency of civil aviation transportation.

References

[1] Xiao Liang. Talking about the innovation of apron safety management [J]. Airport construction, 2013 (4): 39-41.

[2] Ge Xiuhui. Research on Avenue Special Vehicle Management [J]. Digital Communication World, 2016 (4): 95-95.

[3] Chen Gang. Research on Operational Management of Airport Apron of China's Hub Airport [D]. Beijing Jiaotong University, 2008.
[4] Li Chengyang, Du Maowei. Innovating safety supervision mode to ensure the safety of apron operation [J]. China Civil Aviation, 2014 (1): 89-90.
[5] Yang Fang. Design and research of the apron vehicle management system based on GIS [J]. Digital Communication World, 2013 (5): 86-87.
[6] Chen Tiemin, Lin Jinyu, Yang Xuyi. Safety supervision of apron operation [J]. China Civil Aviation, 2010 (5): 60-61.
[7] Wang Wei, Mao Hao, Zheng Muran, et al. Design of aircraft protection system based on CCD and RFID tags [J]. Electronic World, 2014 (8).
[8] Hu Jiangkun. Application of Jiangbei Airport Scene Surveillance System [J]. Electronic Technology and Software Engineering, 2017 (21): 83-84.
[9] Wang Jianbin. Innovating safety supervision mode to ensure apron operation safety [J]. Engineering technology: Abstract edition: 00215-00215.