ISSN: 2414-1895 DOI: 10.6919/ICJE.202102_7(2).0018

Dispatch Release Analysis under Complex Weather Conditions

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Abstract

With the rapid growth of China's civil aviation market demand and the continuous expansion of the scale of airline transport fleet, flight dispatch plays an increasingly important role in Airlines. This paper first introduces the work content of dispatchers, and then focuses on the analysis of three types of important weather phenomena that have an impact on the operation of airlines. Finally, according to different meteorological conditions, the paper puts forward the disposal measures of dispatchers for aircraft operation under complex weather conditions.

Keywords

Flight Safety; Dispatch and Release; Complex Conditions; Disposal Measures.

1. Introduction

In recent years, with the rapid growth of China's civil aviation market demand and the continuous expansion of the scale of airline transport fleet, the pressure and requirements of dispatchers are also increasing. In the operation and management of airlines, dispatchers are in their core position. The quality of their work not only has an important guarantee for the flight safety of airlines, but also has a very important significance to improve the economic benefits of airlines.

The dispatch and release under the complex conditions of various severe weather, flow control, aircraft fault reservation and passenger factors is the most severe challenge to the dispatcher. If air transportation wants to continue to meet the public's expectations of aviation safety, efficiency, economy and convenience, it is very important to study how to improve the quality of the dispatcher's release under complex conditions.

2. Responsibilities of dispatch

The operation control center of an airline company is mainly composed of manager on duty, director on duty, dispatch release, dynamic control, plan coordination, as well as marketing department, flight department, maintenance engineering department and cabin service department. The dispatch room is mainly divided into four seats: dispatch release position, dynamic control position, plan coordination position and duty director. The on duty directors are all flight dispatchers and inspectors.

2.1 Dispatch and release

Understand the contents required for dispatch and release, understand the release skills, especially under the complicated conditions such as severe weather, flow control, aircraft fault reservation and passenger factors, master the relevant basic data of the company, learn the production of computer flight plan, understand the content of flight monitoring, be familiar with the use of MEL, and be

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familiar with the use of FCOM manual. Gradually, the "operation" is gradually updated The manual, operation specification and other manuals are combined with the actual work to learn how to provide help for the crew, coordinate the crew to do a good job in safe flight, and master the storage regulations of relevant records.

2.2 Plan coordination

Master the production and release skills of daily flight plan, be familiar with sending all kinds of aviation dynamic telegrams, be familiar with the extraction of NOTAM, master the contents of NOTAM, and be familiar with various communication methods, methods and use.

2.3 Dynamic monitoring

Be familiar with all kinds of meteorological data, communication methods, operation control methods, control methods, control methods, control methods, etc. Familiar with the use of FOC system.

2.4 Chief on duty

More than three directors on duty are responsible for the decision-making of the team.

3. Important weather phenomena affecting airline operation

3.1 Thunderstorm

Thunderstorm, including thunderstorm and rainfall, is a kind of serious dangerous weather. In Thunderstorm area, in addition to poor visibility, it is often accompanied by rainstorm, strong ascending and descending airflow, icing, hail and other phenomena. In addition, the ascending and descending aircrafts in the terminal area are often between positive and negative loads. The aircraft plays the role of current conduction, thus inducing lightning strike. It is a "weather manufacturing factory", which can produce a variety of weather phenomena endangering aviation flight safety, such as strong turbulence, ice accretion, lightning (lightning), thunderstorm, gale, and sometimes accompanied by hail, tornado, downburst and low-level wind shear. In the dark clouds rolling from the sky, there are huge energy and great destructive power. When the aircraft mistakenly enters the thunderstorm activity area, the light one will cause the human-machine damage, and the heavy one will destroy the aircraft and kill the human. According to the analysis and statistics of civil aviation flight accidents caused by meteorological factors from 1962 to 1988, 23 of 48 accidents were related to thunderstorm, accounting for 47.9% of the total. Therefore, thunderstorm is recognized by aviation and meteorological circles as a serious threat to flight safety [1-2].

3.2 Wind Shear

Wind shear is a kind of atmospheric phenomenon, the change of wind vector (wind direction, wind speed) in the horizontal and (or) vertical distance in the air.

In aviation meteorology, according to different flight paths, low altitude wind shear can be divided into the following three types:

1. Downwind shear: when the downwind increases or decreases along the track, and the aircraft enters the windless or downwind area from the upwind, the indicated airspeed will decrease rapidly, and the lift will decrease significantly, so that the aircraft can not keep the original altitude and fall down.

2. Headwind shear: the upwind increases or decreases along the track, and the aircraft enters the windless or windless zone from the downwind. Headwind shear increases the airspeed, lift and lift of the aircraft, and it does less harm to aircraft taking off and landing than downwind shear.

3. Crosswind shear: the aircraft enters from one crosswind or windless area to another obviously different crosswind area. The crosswind can be divided into left wind and right wind. Crosswind wind shear can make the aircraft sideslip, roll or yaw [3].

3.3 Cold Weather

Operation in cold weather mainly involves low temperature and ice and snow on aircraft, apron, taxiway and runway. According to CCAR 121.649, no one is allowed to take off an aircraft when

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frost, snow or ice is attached to the wing, control surface, propeller, engine inlet or other important surface.

In fact, no matter any part of the aircraft icing, will affect or even endanger flight safety. Some data show that the flight accidents caused by ice and snow account for 25% of the total flight accidents. The effects of ice and snow on flight are various, mainly in the following aspects [4-5]:

1. Pollution effect: the pollution of ice, frost and snow will change the aerodynamic performance of aircraft, and it will always develop in a bad direction. Especially the icing on the wing surface seriously affects the flight safety.

2. Ice accretion will reduce the efficiency of the power plant, and even cause failure: the engine inlet is frozen, and the engine intake is affected, which will reduce the available thrust; at the same time, the falling ice and snow can also damage the engine and the fuselage, causing serious consequences.

3. Icing endangers aircraft control: if the ice, frost and snow accumulation degree and pollution area on the upper surface of left and right wings are inconsistent, the left and right lift force will be inconsistent, and the lift difference will form obvious rolling torque on the longitudinal axis of the aircraft. In the process of take-off, the speed of the aircraft is not large, and the stability is not good. Once the rolling torque is greater than the control torque, the aircraft will be hard to escape the doom of crash in the case of low altitude, small speed and heavy load.

4. Dispatch and release under complex weather conditions

4.1 Analysis of dispatch release under thunderstorm

4.1.1 In the preparation stage of dispatch work

When thunderstorm activity is forecast at the departure airport, route and landing station, the dispatcher must carefully read the weather forecast, understand in detail the possibility of Thunderstorm in the flight area or on the route, analyze the weather situation, determine the intensity, distribution, moving direction, and the height of cloud top and cloud bottom, and report to the captain, so as to prevent the aircraft from entering the thunderstorm area. If it is determined that it is impossible to fly over or bypass the thunderstorm area, the release shall be prohibited [6].

4.1.2 In the arrival and departure phase of aircraft

When thunderstorm activities occur within 25 km of the airport, and the terrain and other conditions permit, the dispatcher shall assist the captain to select different directions to enter, leave or delay takeoff and landing. At the same time, ground radar and airborne radar must be used to obtain data, make judgment and take correct measures through visual observation, tower notification, etc.

4.1.3 When the aircraft is ready to land in thunderstorm

(1) Against blindly rushing to land in front of thunderstorms, we should leave sufficient room for exit;

(2) Landing configuration shall be established when the five sides are more than 1000 feet and ready for landing;

(3) Control the speed of the five sides. In case of crosswind, the maximum speed should not exceed V_{rfe} + 20 nautical miles;

(4) Timely use of wiper and drainage agent on five sides;

(5) Five sides to control the rate of descent, first slowly exit the glide angle, gentle throttle, to prevent too fast and too early;

(6) If the airport with blind landing is within the weather standard, try to use autopilot to land. The pilot should pay attention to monitor the aircraft attitude. When there is a glide and the channel is not normal, the pilot should participate in the control manually in time;

(7) After the aircraft is grounded, use the reverse injection and brake in time to maintain a good direction.

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4.1.4 When encountering thunderstorm area during route flight

During route flight, in case of thunderstorm area, the dispatcher shall assist the crew to change the altitude or temporarily deviate from the route and quickly leave the thunderstorm area to ensure the safety of the aircraft.

Thunderstorm is a kind of weather that endangers aviation flight safety. Therefore, aircraft release in Thunderstorm area should be avoided in general. Dispatchers should work in strict accordance with the dispatch procedures to ensure the safety of aircraft flight.

4.2 Dispatch release analysis under windshear

After knowing the actual situation and forecast of such dangerous weather, the dispatcher must pay attention to the following points:

Before flight, determine whether the weather is airworthiness and decide whether to release the aircraft in strict accordance with the company's "airport use standards". The decision shall be timely reported to the flight, transportation and ground support units or the dispatch operation organization of the agent company, and coordinate the arrangement and preparation of crew, passengers and aircraft.

When you are familiar with the detailed rules for the use of the airport, it is necessary to take into account the influence of wind shear easily formed by the terrain around the airport on flight, and specify under what circumstances there may be wind shear, how to determine and how to avoid it. In case of windshear, it is necessary to inform the air traffic control department in time according to the strength of wind shear, aircraft performance and weather conditions of the day, remind and direct the pilot to land normally, wait in the air, or fly to the alternate aerodrome.

In the process of coordination, it is necessary to strengthen the cooperation with the meteorological department, carefully study the weather situation, strengthen the observation of wind direction and wind speed for the weather with possible wind shear, and timely report the relevant situation to the pilot, so that the pilot can judge the possible low-level wind shear in time, take favorable measures to ensure flight safety, and prohibit the aircraft from entering the known severe wind shear Area.

Equipped with wind shear detection and alarm equipment. The detection ability of conventional meteorological instruments for wind shear is very low, some even ineffective. New equipment should be equipped to meet the requirements of wind shear detection. At present, foreign airports are mainly equipped with Doppler weather radar and a low altitude wind shear warning system with 6 or 11 wind measurement points, which can detect the existence of wind shear in time.

In short, the harm of low altitude wind shear to flight safety can not be ignored. We should send timely and timely response to the low wind. Because the low altitude wind shear is sudden and the time available for disposal is only 10 ~ 15s, it is necessary to make the aircraft obtain the altitude and speed as much as possible.

4.3 Dispatch release analysis under cold weather conditions

4.3.1 icing conditions

According to meteorological knowledge and daily experience, once the following weather phenomena appear in the atmosphere, it is generally considered that icing conditions are met, and airlines should consider aircraft deicing and anti icing work .

4.3.2 key points of dispatch and release under ice and snow weather conditions

Once it is judged that the icing conditions are met, the dispatchers shall strictly follow the provisions of the manual, fully consider the aircraft de icing / anti icing work, and focus on the following aspects .

I. Prepare carefully before release and make flight plan reasonably

(1) Before release, the flight dispatcher shall carefully study the weather data, and judge whether the departure airport, destination airport and alternate airport have icing conditions, as well as the strength, range and altitude of icing according to the icing conditions according to the weather conditions and

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forecasts of the departure airport, destination airport and alternate airport, and in combination with the important weather charts, satellite cloud images, high-altitude maps and other meteorological data. Freezing rain is easy to be ignored, but carefully read the weather message. If the surface temperature is very low while freezing rain is falling, ice will certainly accumulate on the aircraft and runway. Timely remind the crew to pay attention to the above precautions, control the flight release time if necessary, or carry anti icing / de icing fluid at random, which will be the best choice to ensure flight safety.

(2) The flight dispatcher should carefully study the flight notice before leaving to confirm the relevant airport closing time and the airport's snow removal and ice protection capability.

(3) Check the MEL failure retention of the aircraft to determine if there are any restrictions affecting the aircraft's ice-proof capability, and if so, take immediate measures to stop releasing or change the aircraft.

(4) Attention should be paid to the influence of pollution runway and wet runway on aircraft performance.The dispatcher should carefully study the weather freezing conditions, consider the ice pollution of the runway, determine the takeoff performance data based on the airport runway length, gliding time, takeoff weight and other factors, evaluate the aircraft takeoff performance, and then make an accurate release decision.

(5) Additional fuel should be added appropriately, taking into account the processing time and possible delays in deicing/ice protection of the aircraft when making a computer flight plan.

II. Communicate in time to remove security obstacles

(1) Actively communicate with the crew and crew members to understand the freezing condition of the aircraft, and remind them to pay special attention to inspecting the booster, control surface, engine rectifier cover, guide blades, landing gear, wing parts and other parts; understand the progress of deicing/anti-icing and know the maintenance time of deicing fluid.If the ground wait time is too long to exceed the deicing fluid retention time, the relevant regulations should be strictly observed and the flight cannot be released by chance. If necessary, the safest way is to negotiate with the flight crew to slide back to the apron and complete the deicing/anti-icing work again, even if the aircraft is already at the runway head.

(2) Actively communicate and coordinate with the air control department to make sure that the aircraft that has completed the deicing/anti-icing operation take off as soon as possible so as to avoid the second pollution caused by long waiting time due to air control.

(3) Actively communicate with relevant airport meteorological departments, understand relevant airport facts and future weather trends, and pass them to the crew.

(4) Actively contact the relevant airport authorities to know the progress of deicing and snow removal at the airport, master the start deicing time and the estimated end time, and keep track of them.

III. Actively monitor and track related information.First, recognize the complexity of snow and ice release.

5. Conclusion

This paper mainly discusses the complex conditions, the impact of complex conditions on flight, and the dispatcher's guarantee of flight under complex conditions. In dealing with complex weather, in addition to strengthening the monitoring and communication of weather, dispatchers should also improve their ability to analyze and judge the weather. Through the analysis and introduction of the impact of complex conditions on flight, as a dispatcher, not only must have a solid theoretical knowledge, but also a strong sense of responsibility and good psychological quality, and the ability to calmly analyze and handle problems, which lays a solid foundation for ensuring flight safety and creating higher economic benefits.

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