AI2018-8

AIRCRAFT SERIOUS INCIDENT
INVESTIGATION REPORT

JUNEYAO AIR CO., LTD.
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JAPAN COAST GUARD
J A 8 5 7 0

December 20, 2018

JTSB Japan Transport Safety Board

The objective of the investigation conducted by the Japan Transport Safety Board in accordance with the Act for Establishment of the Japan Transport Safety Board and with Annex 13 to the Convention on International Civil Aviation is to prevent future accidents and incidents. It is not the purpose of the investigation to apportion blame or liability.

Kazuhiro Nakahashi
Chairman
Japan Transport Safety Board

Note:

This report is a translation of the Japanese original investigation report. The text in Japanese shall prevail in the interpretation of the report.

AIRCRAFT SERIOUS INCIDENT INVESTIGATION REPORT

TAKE-OFF FROM A RUNWAY BEING USED BY OTHER AIRCRAFT ON RUNWAY 18 AT NAHA AIRPORT AT AROUND18:42 JST, MARCH 18, 2018

1. JUNEYAO AIR CO., LTD.
AIRBUS A320-214 (AIRCRAFT), B8236
2. JAPAN COAST GUARD
DASSAULT-BREGUET MYSTÈRE FALCON 900
(AIRCRAFT), JA8570

November 20, 2018
Adopted by the Japan Transport Safety Board
Chairman Kazuhiro Nakahashi
Member Toru Miyashita
Member Toshiyuki Ishikawa
Member Yuichi Marui
Member Keiji Tanaka
Member Miwa Nakanishi

1. PROCESS AND PROGRESS OF THE INVESTIGATION

1.1 Summary of the Serious Incident	On Sunday, March 18, 2018, an Airbus A320-214, registered B8236, operated by Juneyao Airlines Co., Ltd., commenced a take-off roll and took off from Runway 18 at Naha Airport without receiving a take-off clearance before a Dassault-Breguet Mystère Falcon 900 of Japan Coast Guard, registered JA8570, which had landed earlier, vacated Runway 18.
1.2 Outline of the Serious Incident Investigation	The occurrence covered by this report falls under the category of "Take-off from a runway being used by other aircraft" as stipulated in Item 1, Article 166-4 of the Ordinance of Enforcement of the Civil Aeronautics Act of Japan (Ordinance of the Ministry of Transport No. 56 of 1952), and is classified as a serious incident. On March 19, 2018, the Japan Transport Safety Board (JTSB) designated an investigator-in-charge and three other investigators to investigate this serious incident. An accredited representative of the People's Republic of China, as the State of Registry and Operator of the aircraft involved in this serious incident, and an accredited representative of the French Republic, as the State of Design and Manufacture of the aircraft involved in the serious incident, participated in the investigation. Comments were invited from parties relevant to the cause of the serious incident and the Relevant States.

2. FACTUAL INFORMATION

2.1 History of the Flight

The history of the flight is summarized as below based on the statements of the Pilot in Command (PIC), the first officer (hereinafter, referred to as "FO"), and the second officer (hereinafter referred to as "SO") of the Airbus A320-214, registered B8236 (hereinafter referred to as "the Aircraft A"), operated by Juneyao Airlines Co., Ltd., the PIC of the Dassault-Breguet Mystère Falcon 900 of Japan Coast Guard, registered JA8570 (hereinafter referred to as "the Aircraft B"), and the air traffic controller at aerodrome control position of Naha Airport (hereinafter referred to as "the Tower "), a QAR (quick access recorder) of the Aircraft A, air traffic control communication records (Attachment 1), and airport surface detection equipment (ASDE) records.

Photo 1: Aircraft A

The Aircraft A was to depart from Naha Airport on March 18, 2018 as the scheduled flight 1332 of Juneyao Airlines Co., Ltd., (hereinafter referred to as the "Company") with 115 people in total on board, consisting of a PIC, eight other flight crews and 106 passengers. In the cockpit of the Aircraft A, the PIC sat in the left seat as PF[1], the FO sat in the right seat as PM[1], and the SO in charge of the ATC radio communications sat in the observer seat located in the middle of the back of the cockpit.

The PIC, the FO and the SO, all those three flight crew members of the Aircraft A had a holiday on the previous day and their duties on the day of the incident started in the afternoon; therefore, they were in good condition and did not feel fatigue. There was no pressure to keep to time as the preparation for the departure had been finished earlier than scheduled.

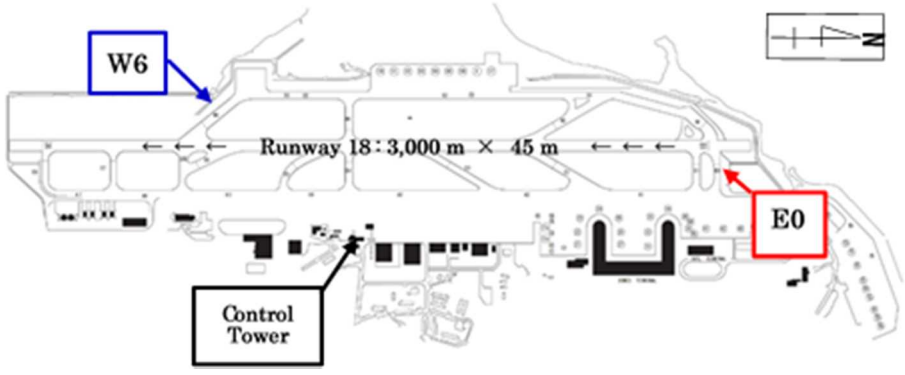


Figure 1: Naha Airport Plan View

While the Aircraft A was taxing toward Taxiway E0 (hereinafter referred to as "E0") in order to take off, the Tower issued a landing clearance for the

[1] "PF" and "PM" are terms for identifying a pilot in terms of role sharing in an aircraft controlled by two people.PF (pilot flying) mainly manipulates the aircraft and PM (pilot monitoring) mainly performs monitoring of flight condition of the aircraft, and makes cross check of operation of PF and operations other than maneuvering.

Aircraft B that was on its final approach course (around 18:40:17 Japan Standard Time [JST: UTC + 9hrs, unless otherwise stated all times are indicated in JST on a 24-hour clock]). The Tower instructed the Aircraft A to hold short of Runway 18 at E0 (18:41:29).

When the Tower confirmed with the Aircraft A on whether to be ready for departure saying "DKH1332, confirm ready for departure," the Aircraft A reported that they were ready (18:41:49). The Tower planned to have Aircraft A take off first and instructed the Aircraft A to enter Runway 18 and wait saying "DKH1332, roger RWY18 at E0, line up and wait", after the Aircraft B had passed in front of E0 (18:41:52).

When its readiness for departure was confirmed by the Tower, the PIC of the Aircraft A thought that it was expected to take off immediately and took it for granted that a take-off clearance should be issued following the Tower's instructions to line up and wait.

Photo 2: Aircraft B

The Tower instructed the Aircraft B, which had landed earlier, to vacate the runway from Taxiway W6 and contact ground control (18:42:20).

In order to cancel the altitude restriction after take-off for the Aircraft A that was about to directly face the runway, the Tower instructed the Aircraft A saying "DKH1332, revised. Maintain FL250[2]. Altitude restrictions cancelled" (18:42:30 to 18:42:35).

Immediately after this transmission started, the PIC of the Aircraft A moved the lever to increase the engine thrust (18:42:31) and released the breaks (18:42:34).

The SO read back to the Tower saying "Altitude restriction 250, DKH1332 (inarticulate sound)" (18:42:36).

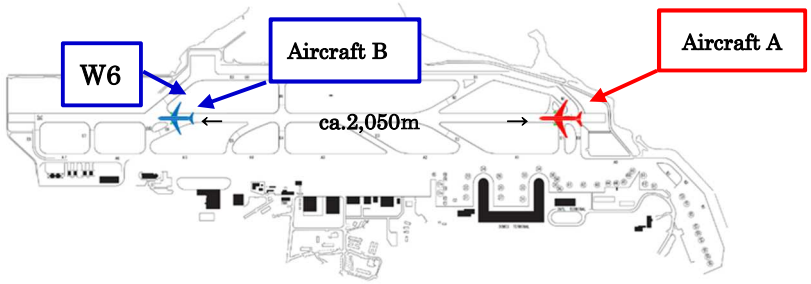
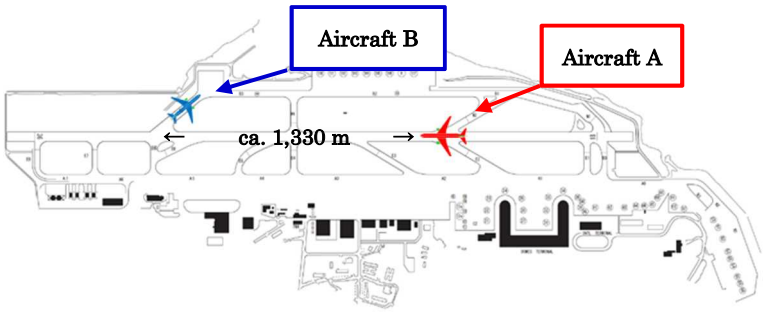
The SO stated that following the instructions on the cancellation of the altitude restriction, he received the take-off clearance from the Tower, and then read it back to the Tower as it was said; however, in ATC communications records there were no record of the communications between the Tower and the SO regarding the take-off clearance.

The Tower considered the SO's read-back incorrect and again sent back the instructions for cancellation of the altitude restriction, and the SO read it back saying "Roger, no restriction, DKH1332" (18:42:45).

While approaching the runway, the PIC of the Aircraft A thought that the Aircraft B, which had landed earlier, would have already vacated the runway; therefore, he did not visually recognize the Aircraft B on the runway in front of it when he commenced a take-off roll.

[2] "FL" is the altitude expressed as a numerical value obtained by dividing the altimeter indication (unit: ft) when the altimeter setting value is set to 29.92 inHg at the pressure altitude of the standard atmosphere by 100. Flight levels are usually used in flight altitudes at or above 14,000 ft in Japan. For example FL 250 represents altitude 25,000 ft.

	While transmitting the instructions for the cancellation of the altitude restriction after take-off to the next departing aircraft, the Tower found that the Aircraft A, which had not received the ATC clearance to take off, had commenced a take-off roll, at once instructing the Aircraft A to stop immediately saying "DKH1332, Hold. Stop, stop immediately, DKH1332, stop immediately" (18:42:52). At this time, the Tower visually confirmed that the Aircraft B was still on the runway around Taxiway W6 and also confirmed it by the ASDE. The Aircraft A continued take-off roll even after the Tower instructed it to stop immediately. All of the three flight crew members of the Aircraft A did not hear the Tower's instructions to stop immediately. When the Aircraft B vacated the runway, the Tower judged that the danger of collision was eliminated due to its relative position to Aircraft A and watched the Aircraft A taking off from the runway. This serious incident occurred at around 18:42 on March 18, 2018, on Runway 18 at Naha Airport (26° 11' 45" N, 127° 38' 45" E).
2.2 Injuries to Persons	None
2.3 Damage to Aircraft	None
2.4 Personnel Information	(1) Captain of the Aircraft A Male, Age 38 Airline Transport Pilot Certificate (Airplane) April 29, 2014 Type rating for Airbus A320 April 29, 2014 Flight Instructor Certificate July 20, 2017 Aviation Medical Certificate Validity date: July 8, 2018 Aviation English Language Proficiency Certificate (Level 4 Language Proficiency) Validity date: March 27, 2019 Total flight time 11,283 hours 00 minute Flight time on the same type of aircraft 4,851 hours 00 minute Flight time in the last 30 days 62 hours 28 minutes (2) FO of the Aircraft A Male, Age 33 Commercial Pilot Certificate (Airplane) May 23, 2007 Type rating for Airbus A320 May 23, 2007 Aviation Medical Certificate Validity date: February 14, 2019 Aviation English Language Proficiency Certificate (Level 4 Language Proficiency) Validity date: July 26, 2020 Total flight time 7,019 hours 00 minute Flight time on the same type of aircraft 2,223 hours 00 minute Flight time in the last 30 days 74 hours 54 minutes (3) SO of the Aircraft A Male, Age 36 Commercial Pilot Certificate (Airplane) May 4, 2012 Type rating for Airbus A320 May 4, 2012 Aviation Medical Certificate Validity date: October 16, 2018 Aviation English Language Proficiency Certificate (Level 4 Language

	Proficiency) Validity date: October 25, 2020 Total flight time 3,958 hours 00 minute Flight time on the same type of aircraft 3,394 hours 00 minute Flight time in the last 30 days 69 hours 25 minutes
2.5 Aircraft Information	Aircraft A Type: Airbus A320-214; Serial number: MSN6808; Date of manufacture: October 29, 2015 Certificate of airworthiness: AC6449
2.6 Meteorological Information	Aeronautical weather regular observations at Naha Airport about the time of this serious incident were as follows: 18:30 Wind direction 130°; Wind velocity 8 kt (3.6 m/s); Visibility 10 km or more; Cloud FEW 2,500 ft; Temperature 22 °C; Dew point 15 °C; Altimeter setting (QNH) 30.00 inHg
2.7 Additional Information	(1) Relative position of the two aircraft According to the ASDE records, the relative position of the two aircraft on Runway 18 was as follows:  Figure 2: The position of the Aircraft B when the Aircraft A commenced a take-off roll  Figure 3: The position of the Aircraft A when the Aircraft B vacated the runway (2) Situation of communications When the serious incident occurred, there were no abnormalities identified in the situation of communications between the Tower and the Aircraft A. In addition, the flight crews of the other aircraft, who were listening on the same frequency as the Aircraft A, had clearly heard the Tower giving instructions to the Aircraft A to stop immediately. (3) The SO's duties of the Aircraft A

	Although the SO in the observer seat was officially announced as a first officer by the Company, he was on-the-job training for ATC communications on board the scheduled flight 1332 in order to obtain the Company's qualifications for English language communication necessary for international flights in accordance with the Company's regulations. (4) ATC communications procedures According to the Company's regulations, the operation of the same aircraft type as the Aircraft A is normally carried out with a two-pilot system where the PIC is in charge of PF and the FO is in charge of PM, and the ATC communications are conducted mainly by PM. It is stipulated that the flight crew member in charge of the ATC communications shall use standard words and terms, inform other flight crew members of the ATC instructions and others with a loud voice in a timely and accurate manner, and make mutual confirmation of the communication contents among the flight crew members. Furthermore, the important instructions such as take-off and landing clearances are required to read back the contents of the instructions, and if it is uncertain, it is required to check with the ATC. (5) ATC procedures at Naha Airport Naha Airport is located adjacent to Kadena Air Base and Futenma Air Station. As a result, the altitude restriction is applied for the departure aircraft from Naha Airport immediately after take-off because the flight routes for both take-off and landing aircraft at Naha Airport and the two US air bases are closely established and crossed. When possible, the air traffic controller may cancel the altitude restriction so that departure aircraft can climb efficiently; and the controller may issue the instructions for the cancellation of the altitude restriction and the take-off clearance, either at the same time or separately, depending on the air traffic conditions. At the time of the serious incident, the Tower was planning to issue these ATC instructions separately to the Aircraft A taking into consideration the overall efficiency of traffic.

3. ANALYSIS

3.1 Involvement of Weather	None
3.2 Involvement of Pilots	Yes
3.3 Involvement of Aircraft	None
3.4 Analysis of Findings	(1) Take-off clearance In principle, it is required that the take-off clearance should be issued in the order of the following words and terms such as "wind direction and wind velocity, runway number, and 'Cleared for take-off'." It is necessary for the flight crew member to read back the term "cleared for take-off" clearly. According to the ATC communications records, it was confirmed that

there would be neither the take-off clearance from the Tower to the Aircraft A nor the read-back of "Cleared for take-off" from the Aircraft A to the Tower.

(2) The commencement of a take-off roll of the Aircraft A

It is somewhat likely that the PIC of the Aircraft A, expecting that the take-off clearance would be issued promptly, ran away with the idea from his past experience at Naha Airport that the take-off clearance had been issued at the same time when the Tower started transmitting the instructions for the cancellation of the altitude restriction; therefore, with a hasty judgment he moved the lever to increase the engine thrust and released the brakes.

It was probable that the PIC should have made mutual confirmation of whether to receive the take-off clearance from the Tower among the flight crew members without fail.

On the other hand, it is somewhat likely that while hearing the Tower's instructions for the cancellation of the altitude restriction and seeing the PIC start to move the thrust lever in front of him, the SO perceived mistakenly that they had received a take-off clearance or he read back inaccurately to the Tower without surely grasping the contents of ATC communications.

It is important for flight crews to find generally possible errors such as hasty judgments and misunderstandings and prevent them from leading up to serious consequences by complying with basic procedures stated in the standard operation procedures (SOP) regarding the read back and mutual confirmation of ATC instructions and appropriately exercising CRM skills for monitors, assertions and others.

(3) Regarding the fact that the Aircraft continued take-off roll

Regarding the fact that the Aircraft A continued take-off roll even though the Tower instructed it to stop immediately, it is highly probable that the flight crew members of the Aircraft A had failed to hear the Tower's instructions because at that time there were no abnormalities identified in the situation of communications of the Aircraft A, and the flight crews of the other aircraft, who were listening on the same frequency as the Aircraft A, had clearly heard the Tower giving instructions to the Aircraft A to stop immediately.

As for the reason the flight crew members of the Aircraft A had failed to hear the Tower's instructions, it is somewhat likely that as the Tower interrupted its transmissions to the next departing aircraft and transmitted to the Aircraft A, the flight crew members of the Aircraft A could not recognize that the Tower's instructions to stop immediately were addressed to them even if the Tower called out "DKH1332" repeatedly.

Flight crew members must listen to the tower communications even after the take-off procedure has started, because the instructions to immediately stop from the tower controller after the take-off roll are issued to avoid the danger.

(4) ATC communications conducted in the observer seat

As the Company allows flight operations with a three-pilot system where an additional flight crew member in the observer seat is in charge of the ATC communications, on-the-job training for ATC communications is frequently

	conducted in the observer seat. It is probable that it would be difficult for the flight crew members to confirm that they share the communication contents when ATC communications are conducted by a flight crew member in the observer seat because the seating setups for the flight crew members are separated into the front and rear seats, which make it difficult to confirm their mutual facial expressions. In this case, it is necessary to make more proactive and reliable mutual confirmation among the flight crew members in order to ensure that they grasp the contents of ATC communications and share the information. As at the time of the serious incident, the SO in the observer seat was on-the-job training for ATC communications; therefore, it is probable that the PIC and the FO should have more carefully monitored and confirmed the ATC communications. (5) Risk assessment As shown in Figure 3, the estimated separation between the Aircraft A and the Aircraft B was 1,330 m. According to ICAO "Manual on the Prevention of Runway Incursions," it is certain that the severity of risk for this serious incident falls in the "Category C (an incident characterized by ample time and/or distance to avoid a collision). (See Attachment 2: Classification of the Severity of Runway Incursions)

4. PROBABLE CAUSES

It is highly probable that this serious incident occurred as follows: Without receiving a take-off clearance from the Tower, the Aircraft A commenced a take-off roll on the runway where the Aircraft B, which had landed earlier, was still present on the runway; furthermore, although the Aircraft A had failed to hear the Tower's instructions to stop immediately, it continued take-off roll.

As for the reason that the Aircraft A commenced a take-off roll without a take-off clearance from the Tower, it is somewhat likely that the PIC failed to make mutual confirmation of whether to receive the take-off clearance among the flight crew members and made a hasty judgment that they would have received it.

5. SAFETY ACTIONS

Upon the occurrence of the serious incident, the Company has taken the following measures to prevent its recurrence.

(1) The Company organized instructors and inspectors who are qualified for international flight to have specific technical discussion and analysis of the operational features of Naha Airport. Afterwards, the Operation Bulletin of Naha Airport was published.

(2) The Company organized instructors and inspectors who are qualified for international flight to study the operation, communication and ATC control features of Naha Airport. Afterwards, specific training for Naha Airport was held for 424 flight crew who are qualified for international flight.

(3) The Company organized flight instructors and risk-management experts to re-study the operational features of each international / regional flight services and revised the courseware. Afterwards, specific training was held for all the instructors and 424 flight crew who are qualified for international flight.

(4) For the communication requirement for three crew in the cockpit, the Company has finished the revision of the relevant part of Flight Technique Management Manual and specific training was held for all fight crew.

(5) In response to this event, the Company has revised requirements and rules in Flight Technique Management Manual, which clearly point out that the person who hasn't acquired in-house English communication qualification in relevant international areas will not conduct the training as an ATC trainee during take-off and landing in foreign airports.

ATC Communications Records

Time	Transmitter	Communication contents
18:41:24	DKH1332	TOWER, DKH1332, FOR DEPARTURE RWY18.
18:41:29	TWR	DKH1332, NAHA TOWER, ROGER, HOLD SHORT OF RWY18.
18:41:33	DKH1332	HOLD SHORT OF RWY18, DKH1332.
18:41:36	ANA474	NAHA TOWER, ANA474, E1 READY.
18:41:39	TWR	ANA474, TOWER, HOLD SHORT OF RWY18.
18:41:42	ANA474	HOLDING SHORT OF RWY18, ANA474.
18:41:46	TWR	DKH1332, CONFIRM READY FOR DEPARTURE.
18:41:49	DKH1332	AFFIRM, DKH1332.
18:41:52	TWR	DKH1332, ROGER, RWY18 AT E0, LINE UP AND WAIT.
18:41:56	DKH1332	LINE UP AND WAIT RWY18 AT E0, DKH1332.
18:42:10	ANA1780	NAHA TOWER, ANA1780, LEAVING 3,900, PROCEED TO 3 MILES ON FINAL RWY18.
18:42:17	TWR	ANA1780, TOWER, ROGER.
18:42:20	TWR	JA8570, TURN RIGHT W6, CONTACT GROUND 121.8.
18:42:25	JA8570	TURN RIGHT W6, CONTACT GROUND 121.8, JA8570, GOOD DAY.
18:42:29	TWR	GOOD DAY.
18:42:30	TWR	DKH1332, REVISED. MAINTAIN FLIGHT LEVEL 250. ALTITUDE RESTRICTIONS CANCELLED.
18:42:36	DKH1332	ALTITUDE RESTRICTION 250, DKH1332. (-- --)
18:42:42	TWR	DKH1332, THAT'S CORRECT. NO RESTRICTION.
18:42:45	DKH1332	ROGER, NO RESTRICTION, DKH1332.
18:42:47	TWR	ANA474, NUMBER 2 DEPARTURE, AND REVISED. MAINTAIN FLIGHT LEVEL 250 (Aah).
18:42:52	TWR	DKH1332, HOLD. STOP, STOP IMMEDIATELY. DKH1332, STOP IMMEDIATELY.

Legend	Time	Japan Standard Time (hh:mm:ss)
	TWR	The air traffic controller at aerodrome control position of Naha Airport
	DKH1332	B8236 (Aircraft A), operated by Juneyao Airlines Co., Ltd.
	JA8570	JA8570 (Aircraft B) of Japan Coast Guard
	ANA474	All Nippon Airways Flight No. 474 (Departing aircraft)
	ANA1780	All Nippon Airways Flight No. 1780 (Arriving aircraft)
	(-- --)	This indicates inarticulate sound. (unreadable)

Classification of the Severity of Runway Incursions

The classification related to the risk measurement described in the "Manual on the Prevention of Runway Incursions" (Doc 9870) published by ICAO are as shown in the table below.

Table 6-1. Severity classification scheme

Severity classification	*Description **1*
A	*A serious incident in which a collision is narrowly avoided.*
B	*An incident in which separation decreases and there is significant potential for collision, which may result in a time-critical corrective/evasive response to avoid a collision.*
*C **2*	*An incident characterized by ample time and/or distance to avoid a collision.*
D	*An incident that meets the definition of runway incursion such as the incorrect presence of a single vehicle, person or aircraft on the protected area of a surface designated for the landing and takeoff of aircraft but with no immediate safety consequences.*
E	*Insufficient information or inconclusive or conflicting evidence precludes a severity assessment.*

**1. Refer to Annex 13 for the definition of "incident."

**2. Shading is added to indicate the applicable category in order to show the applicable category of this serious incident.