AI2021-8

AIRCRAFT SERIOUS INCIDENT
INVESTIGATION REPORT

FUJI DREAM AIRLINES CO., LTD.
J A 1 1 F J

October 28, 2021

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.

TAKEDA Nobuo
Chairperson
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.

《Reference》

The terms used to describe the results of the analysis in "3. ANALYSIS" of this report are as follows.

i) In case of being able to determine, the term "certain" or "certainly" is used.
ii) In case of being unable to determine but being almost certain, the term "highly probable" or "most likely" is used.
iii) In case of higher possibility, the term "probable" or "more likely" is used.
iv) In a case that there is a possibility, the term "likely" or "possible" is used.

AIRCRAFT SERIOUS INCIDENT INVESTIGATION REPORT

RUNNING OFF THE SIDE OF RUNWAY
FUJI DREAM AIRLINES CO., LTD.
EMBRAER ERJ 170-200 STD, JA11FJ
YAMAGATA AIRPORT, JAPAN
AROUND 16:46 JST, APRIL 23, 2019

October 8, 2021
Adopted by the Japan Transport Safety Board
Chairperson: TAKEDA Nobuo
Member: MIYASHITA Toru
Member: KAKISHIMA Yoshiko
Member: MARUI Yuichi
Member: NAKANISHI Miwa
Member: TSUDA Hiroka

1. PROCESS AND PROGRESS OF THE AIRCRAFT SERIOUS INCIDENT INVESTIGATION

1.1 Summary of the Serious Incident	On Tuesday, April 23, 2019, an Embraer ERJ 170-200 STD, registered JA11FJ, operated by Fuji Dream Airlines Co., Ltd., started takeoff roll to fly from Yamagata Airport to Prefectural Nagoya Airfield with a total of 64 people, consisting of the pilot in command, three crew members, and 60 passengers, then ran off while veering to the left, and stopped in the grass field.
1.2 Outline of the Serious Incident Investigation	The occurrence covered by this report falls under the category of "Deviation from a runway (when an aircraft is disabled to perform taxiing)" as stipulated in Article 166-4, item (iii), the Ordinance for Enforcement of Civil Aeronautics Act of Japan (Ordinance of the Ministry of Transport No. 56 of 1952) prior to revision by the Ministerial Ordinance on Partial Revision of the Ordinance for Enforcement of Civil Aeronautics Act of Japan (Ordinance of Ministry of Land, Infrastructure, Transport and Tourism No. 88 of 2020), and is classified as a serious incident. On April 23, 2019, the Japan Transport Safety Board (JTSB) designated an investigator-in-charge and three other investigators to investigate this serious incident. An accredited representative and an advisor of the Federative Republic of Brazil, as the State of the Design and Manufacture of the aircraft involved in this serious incident, and accredited representatives of the French Republic and the Federal Republic of Germany as the States of Manufactures of the aircraft parts, participated in the investigation. Comments on the draft Final Report were invited from parties relevant to the cause of the serious incident. Comments on the draft Final Report will be invited from the Relevant States.

2. FACTUAL INFORMATION

2.1 History of the Flight

Figure 1: Serious Incident Aircraft

According to statements of the pilot in command (PIC), the first officer (FO), records of the flight recorder which recorded the flight data and the voice in the cockpit, and communication records with Yamagata Airport Mobile Communication Station, the history of the flight up to the serious incident is outlined below.

On April 23, 2019, around 16:37 JST (UTC+9 hours; unless otherwise noted, all times are indicated in JST in this report on a 24-hour clock), an Embraer ERJ 170-200 STD, registered JA11FJ, operated by Fuji Dream Airlines Co., Ltd. (hereinafter referred to as "the Company") as a scheduled flight 386, off-blocked from the apron to take off from Yamagata Airport bound for Prefectural Nagoya Airfield.

In the cockpit of the Aircraft, the PIC sat in the left pilot's seat as PF*1 and the FO in the right pilot's seat as PM*1. The flight crew members checked that there was no abnormality in each system of the Aircraft in accordance with the Airplane Operations Manual (AOM) of the Company before moving to the runway.

The flight crew members decided they could take off from runway 19 based on the aviation routine weather report for the Airport (See 2.5) and the wind data, which was observed at runway 19 side, received from an aeronautical information officer of Yamagata Airport Mobile Communication Station, the PIC taxied with no problem from the apron to the starting point of takeoff using the Nosewheel Steering Handwheel (hereinafter referred to as "the Handle").

After the flight crew members confirmed with EICAS messages and others that there was no abnormality in the Aircraft prior to the start of takeoff roll, the PIC increased the engine thrust up to 40%N1 while pressing the brake pedals by taking into account the tailwind, and confirmed that the acceleration state for both engines was stable, then released the brake pedals, set the thrust lever at the takeoff position, and started takeoff roll around 16:44:54 (See Figure 2 a).

*1 "PF" and "PM" are the terms used to identify pilots by their different roles in aircraft operated by two persons. PF is an abbreviation of Pilot flying and is mainly responsible for maneuvering the aircraft. PM is an abbreviation of Pilot Monitoring mainly responsible for monitoring flight status of the aircraft and cross-checking of PF's maneuvering and undertakes other non-operational tasks.

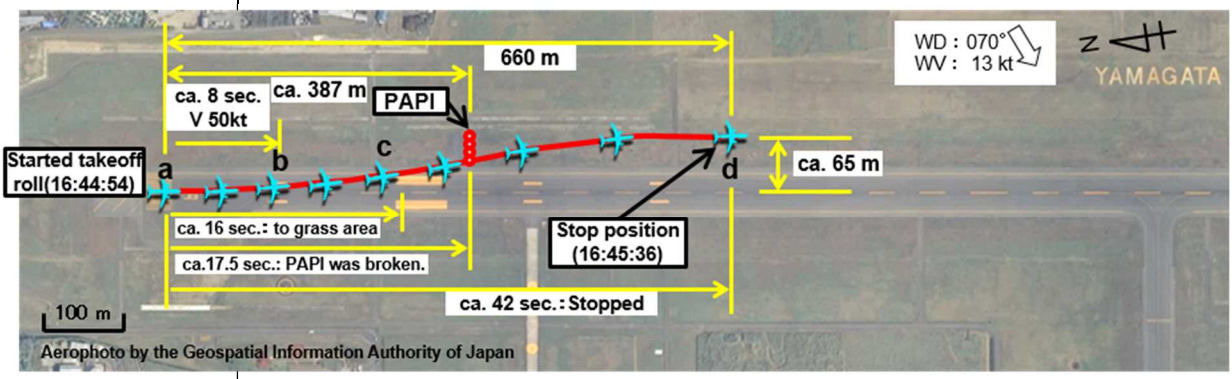

Figure 2: Estimated running track

Soon after starting takeoff roll, the Aircraft began to veer to the left of the runway centerline. The PIC thought that the Aircraft's nose would be going to veer to the left due to the weathercock effect as it was receiving the left tailwind, and tried to change the nose direction by applying the right rudder pedal, however, could not change the direction even with the maximum rudder pedal input.

When the FO looked outside after checking with engine instruments that the takeoff thrust was set normally, he noticed that the Aircraft was on the takeoff roll while changing its direction to the left of the runway centerline. Looking at the PIC, the FO recognized that he was going to correct the direction. Hearing the voice of the PIC saying "Rudder", the FO was going to apply the right rudder pedal, but there was no pedal reserve for the right rudder.

The PIC decided to abort the takeoff about eight seconds after starting it, moved the thrust lever to the idle at about 50 kt (See Figure 2 b), then set it at the reverse position.

The PIC did not apply the brakes because he judged that running off the runway would be unavoidable and he was afraid the Aircraft's attitude might be unstable after running off.

About 16 seconds after starting the takeoff, the Aircraft ran off the side of the runway (See Figure 2 c).

Because the PIC found the Precision Approach Path Indicator (PAPI) in the running direction, he tried to avoid a collision with it using the Handle, however, he felt an impact. After that, the Aircraft stopped in the grass field (See Figure 2 d).

A maintenance technician, who arrived at the Aircraft, identified that the Aircraft would not be able to move on its own. The flight crew members did not acknowledge the warning light, the EICAS messages and others indicating the Aircraft abnormality until the Aircraft came to stop after it started its takeoff.

Yamagata Airport was closed until 09:30 on the next day, April 24, 2019, and eight flights in total were cancelled.

The serious incident occurred at Yamagata Airport (38°24'52" N,

	140°22'21" E) around 16:46 on April 23, 2019.

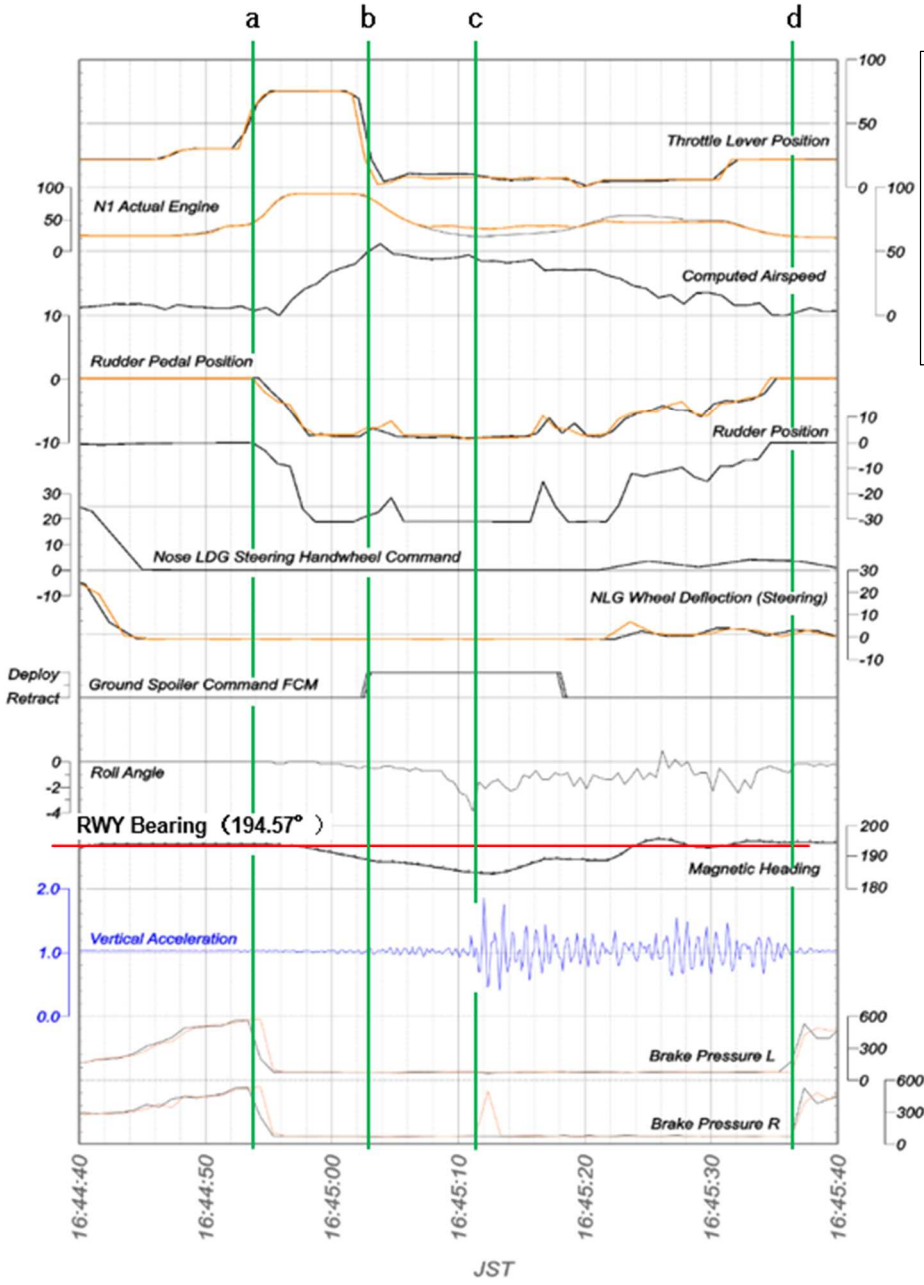

Figure 3: Flight data

2.2 Damage to Aircraft	Extent of damage: Slightly damaged (1) Impact damage on the lower fuselage (two spots) (2) Nose tires broken.
2.3 Personnel Information	(1) PIC Age 41 Airline transport pilot certificate (Airplane) May 26, 2016 Type rating for Embraer ERJ-170 November 2, 2012 Class 1 aviation medical certificate Validity December 25, 2019 Total flight time 5,222 hours 57 minutes Flight time in the last 30 days 71 hours 50 minutes

	Total flight time on the same type of aircraft 4,974 hours 29 minutes Flight time in the last 30 days 71 hours 50 minutes (2) FO Age 49 Commercial Pilot Certificate (Airplane) September 3, 1997 Type rating for Embraer ERJ-170 July 3, 2009 Instrument flight certification July 21, 1998 Class 1 aviation medical certificate Validity April 2, 2020 Total flight time 8,535 hours 52 minutes Flight time in the last 30 days 71 hours 30 minutes Total flight time on the same type of aircraft 6,444 hours 10 minutes Flight time in the last 30 days 71 hours 30 minutes
2.4 Aircraft Information	(1) Aircraft Type: Embraer ERJ 170-200 STD Serial number: 17000526 Date of manufacture: May 30, 2016 Certificate of airworthiness: DAI-2018-130 Validity: During a Period in which the aircraft is maintained in accordance with the Maintenance Management Manual (Fuji Dream Airlines Co., Ltd.) Category of airworthiness: Airplane, Transport T Total flight time 7,548 hours 21 minutes (2) When the serious incident occurred, the Aircraft's weight was estimated to have been 71,505 lb and its center of gravity at 18.0 %MAC*2, both of which were within the allowable range.
2.5 Meteorological Information	According to the aviation routine weather report for the Airport around the time of the serious incident, the visibility was 10 km or more, the weather phenomena such as the rainfall phenomena and others were not announced. In addition, the wind direction and wind velocity are as follows: Table 1: Wind direction and wind velocity around the time of the serious incident

Observation time	15:00	16:00	17:00
Wind direction (°)	070	070	070
Wind velocity (kt)	13	13	13

2.6 Additional Information	(1) Damage to Objects on the Land Among the four lights of the PAPI installed about 387 m from the threshold of Runway 19 on the east side of the runway, the D light (about 38 m east from the runway centerline), which is the closest to the runway, was broken.

*2 "MAC" stands for Mean Aerodynamic Chord. This term means the wing chord that represents the aerodynamic performances of wings and indicates their average for cases in which the wing chord is in an irregular condition, such as the swept-back wing. The figure in question, 18 %MAC, shows a position 18 % from the leading edge of the mean aerodynamic chord.

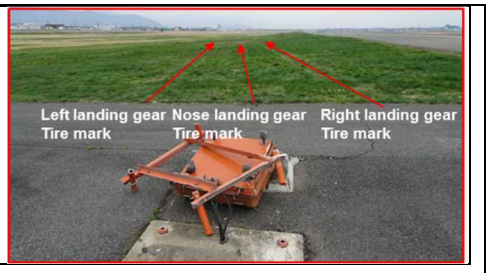

Figure 4: Damaged PAPI

(2) Serious Incident Site

At Yamagata Airport, there is a runway in a magnetic bearing of 014° / 194° with a length of 2,000 m and a width of 45 m. The runway surface is paved with an asphalt-concrete and has a downslope toward both sides of the runway edge from the runway centerline. As no parallel taxiway is installed, an aircraft taking off turns its nose to the takeoff direction using a turning area installed near each end of the runway.

The Aircraft stopped in the grass field about 660 m from the starting point of its takeoff roll and about 65 m east of the runway centerline, with its nose facing a magnetic bearing of 196°.

(3) Nosewheel Steering

The Aircraft can control its direction by changing the direction of the nosewheel in the handwheel steering mode (hereinafter referred to as "the Handle mode") by use of the Handle (See Figure 5 a) installed on the left side of the left pilot seat or in the rudder pedal steering mode (hereinafter referred to as "the Pedal mode") by use of the rudder pedals installed at the foot part of both pilot seats (See Figure 5 b). In addition, when the steering system is disengaged for operational check of the rudder on the ground and towing, or the steering system is disengaged automatically when there is a failure in the system related to the steering system, the corresponding EICAS messages are displayed respectively, and the steering mode changes to the freewheel mode and the nosewheel steering is disabled.

However, it is still possible to control the direction of the aircraft by a rudder, differential braking, and differential thrust even in the free mode."

Besides, when the Aircraft was stationary, its nosewheel faced to the left of the aircraft axis of about 0.1° (Limit: 1.0°).

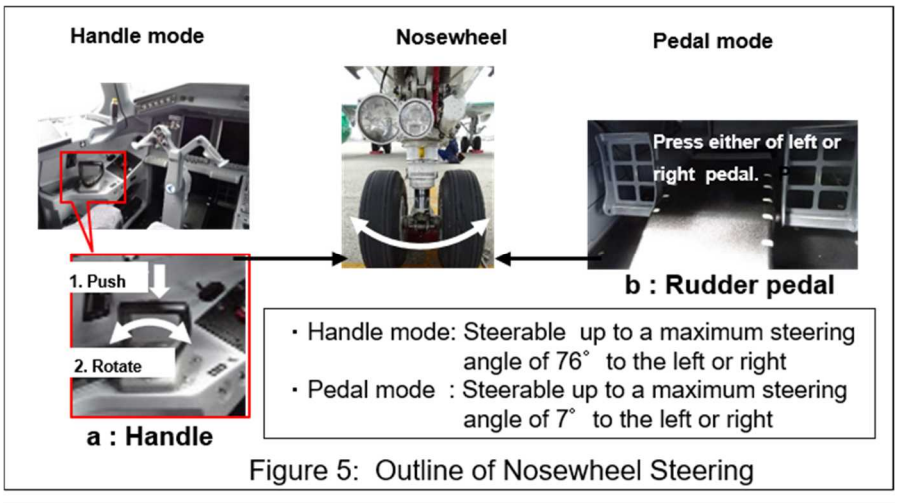

Figure 5: Outline of Nosewheel Steering

The Handle mode can change the steering angle up to 76° to left or right by rotating the Handle while pressing it down and is mainly used in case of low-speed running or whenever a wider turn angle is required. Besides, the range of operational steering angle is changed in relation to the wheel's rotating speed (See Figure 6). Moreover, a change of the steering angle is not linear against a control input on the Handle.

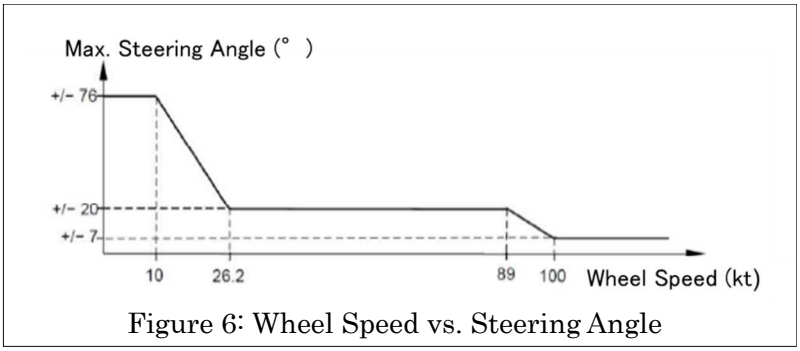

Figure 6: Wheel Speed vs. Steering Angle

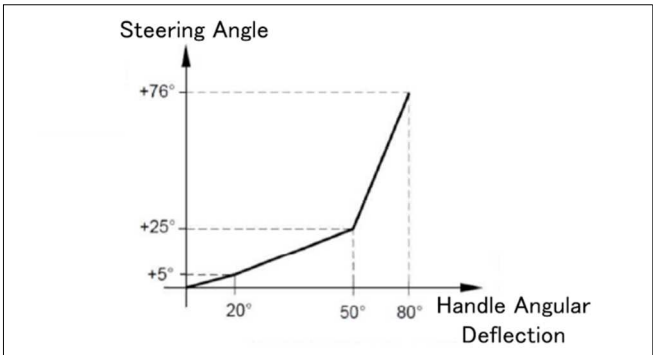

Figure 7: Handle Angular vs. Steering Angle

On the other hand, the Pedal mode can change the steering angle up to 7° to the left or right by applying the rudder pedals when the Handle is not pushed down and is used for high-speed running or whenever a wider turn is not required. Moreover, the change of the steering mode is done by actuation of the microswitch in the Handle when pressing down it, it is not possible to use the Handle mode and the Pedal mode simultaneously.

When investigating on-site after the serious incident had occurred, the onboard maintenance computer of the Aircraft indicated its steering mode stayed in the Handle mode even when the Handle was not kept pressed down. Moreover, it was identified that the nose steering could not be operated by the rudder pedals when performing the operational examination on the nose wheel steering.

Furthermore, QAR data indicates that the handle switch command to engage the handle mode remained active until the serious incident occurred after the switching of the steering mode was functioning normally for the period of about 3 minutes after the taxi-out for the preceding flight at New Chitose Airport.

(4) Detailed Investigation of Relevant Nosewheel Steering Parts

In the detailed investigation of relevant nosewheel steering parts performed by each manufacturer, there was no abnormality on the parts other than the Handle.

In the detailed investigation, although there was no abnormality on the Handle in appearance, it was identified that the microswitch stayed in the Handle mode even when the Handle was not pressed down in the continuity

test of the microswitch in the Handle subsequently performed.

Moreover, no abnormality was identified when performing the internal visual inspection without pushing the handle and the operational check on the Handle except for the microswitch.

After that, when performing the investigation regarding the state inside the Handle using X-ray photography, it was revealed that the microswitch of the Aircraft sent the signal electrically for the Handle mode, even though its internal state mechanically indicated the similarity with the state in the Pedal mode (See Figure 8), however, the cause couldn't be identified.

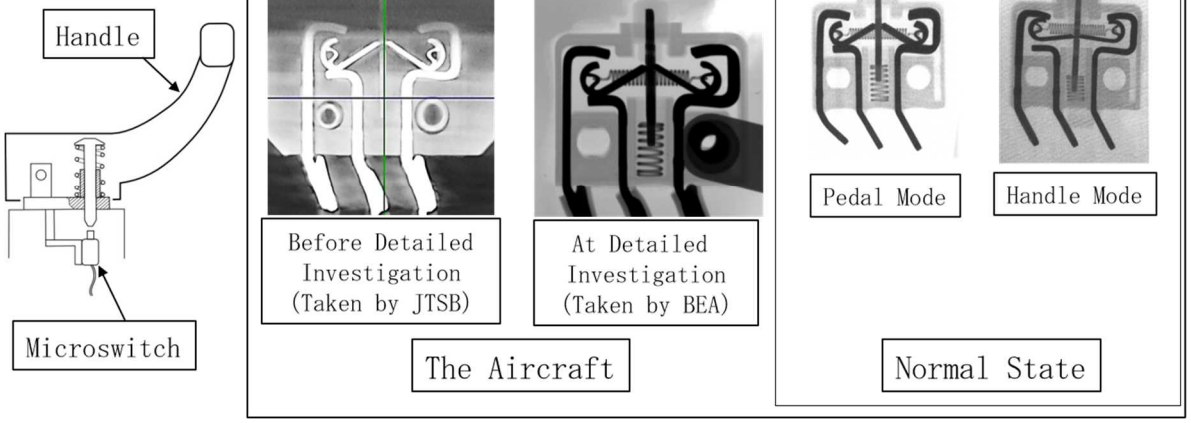

Figure 8: X-ray Photograph inside Microswitch

While at work for disassembly investigation of the microswitch that performed subsequently, the state where the Handle mode had been kept unchanged was eliminated, and after that, it was not reproduced. When observing the disassembled microswitch by a digital microscope, a very small amount of the metal fine particles and the fibrous material were observed near the contact points.

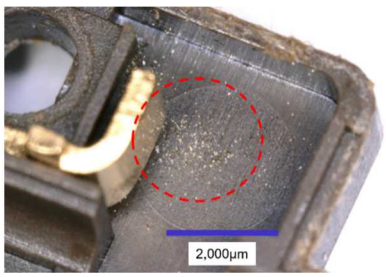

Figure 9: Metal fine particles

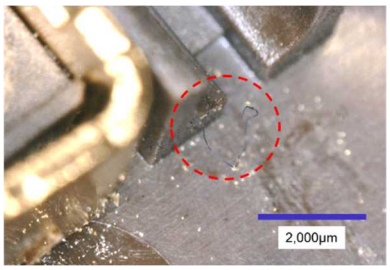

Figure 10: Fibrous material

It is probable that the metal fine particles result from worn contact points inside the microswitch, however, the amount of metal fine particles was too small to determine the reason why the microswitch was in the Handle mode, in addition, it is highly probable that the fibrous material was low in the conductive property as a result of the investigation by a scanning electron microscope, therefore, neither was able to clarify the relationship to the fact that the microswitch had been in the Handle mode.

(5) EICAS Messages on the Steering System

According to the AOM of the Company, there are following EICAS messages on the steering system, but there is no function to notify the pilot of whether it is in the Handle mode or in the Pedal mode.

a. STEER FAIL: Indicates a steering system failure condition.

b. STEER FAULT: Indicates a steering system is degraded.

c. STEER OFF: Indicates a steering is in the Free mode.

Besides, there is no message to indicate the state where the steering mode cannot change properly due to any abnormality in the microswitch.

(6) Brake Operation at the Time of Rejected Takeoff

Chapter 03 Normal Procedures, 3-16 Takeoff REJECTED TAKEOFF in the AOM of the Company contains following descriptions regarding the brake operation at the time of aborting takeoff.

Confirm that Auto Brake RTO Mode is activated. Apply the maximum braking when it is not activated.

Besides, the Auto Brake RTO Mode is activated, when the wheel speed is over 60 kt and the thrust levers are moved to the idle position or the reverse position.

(7) Distance Required to Stop after Aborting Takeoff

Regarding the distance required for the Aircraft to completely stop from the starting point of applying the maximum braking, after the thrust lever was moved to the idle position in order to abort the takeoff at about 50 kt, the manufacture estimated it at about 85 m.

(8) Examination using Flight Simulator

Using a flight simulator for training, the examination was performed to see whether there had been a possibility to stop within the runway if the PIC had made the rejected takeoff procedure stipulated in AOM when he had decided to abort takeoff (when the thrust levers had been moved toward the idle direction) while simulating the track of the Aircraft based on the flight data record of the flight recorder recorded at the time of the serious incident.

As a result of conducting several operations of the rejected takeoff procedure, there were the case where the aircraft was able to stop within the runway, and the other case where the aircraft ran off the side of the runway. Even when the aircraft was not able to stop within the runway, it was able to reduce the degree of running off the side of the runway because the speed would reduce until running off.

Furthermore, this examination was conducted based on the flight data in the flight recorder at the time of the serious incident, however, from the point of view of the performance of the simulator, the situations at the time of the serious incident could not be completely reproduced.

(9) Simulator Training of the Company

The Company stipulates that a rejected takeoff at a speed less than 80kt is a rejected takeoff at low speed.

The training scenario, which was prepared by the design/manufacturer as a reference for the operators, did not specify the time of conducting an aborting takeoff. In addition, the Company chose an aborting takeoff at high

	speed as the training scenario in consideration of the training effectiveness. (10) How to Check the Steering Mode a. Manufacturer According to the manufacturer, in case that there is no abnormality on the microswitch in the Handle, EICAS message "STEER OFF" appears when pushing the steering disengage switch to disengage the rudder pedals from the nosewheel steering system at the operational checks on the flight control system, after that, it will continue to indicate until pressing down then releasing the Handle in order to make the nosewheel steering recover to its operational state. On the other hand, when the steering mode remained in the handle mode because of the abnormality in the microswitch as in the case of this serious incident, the EICAS message "STEER OFF" becomes active when a flight crew member presses the steering disengagement switch and disappears automatically after the flight crew member releases the steering disengagement switch. The manufacturer explains it is possible to identify the steering mode state if a flight crew member checks when the EICAS message "STEER OFF" would disappear when performing the procedure for the operational check before a flight. However, there is no description regarding checking when the EICAS message "STEER OFF" would disappear in the procedure described in the AOM at the time of the serious incident. In addition, the manufacturer explains it is possible to perceive the abnormality in the steering mode if using the Pedal mode when taxiing. b. The Company After the serious incident, the Company issued the Operating Information*3 to provide the flight crew members with information. (Excerpt) *2. How to detect and handle the steering system abnormality* *A. Rudder Steering Mode abnormality* *(1) How to detect* *At take-off, when the aircraft is lined up and the steering handle is released, rotate the Steering Handle left or right without pressing the Handle to confirm the aircraft (Nose Tire) would not move to left or right.* *(2) How to handle it when steering system abnormality is detected* *If the aircraft (Nose Tire) moves when rotating the Steering Handle left or right, perform "Ground Turn Back" and ask for maintenance actions.*

3. ANALYSIS

3.1 Involvement of Weather	Yes

*3 "Operating Information" refers to reference information on aircraft operation which provides additional information related to the AOM and aircraft modification information and others related to the operation.

3.2 Involvement of Pilot	None
3.3 Involvement of Aircraft	Yes
3.4 Analysis of Findings	(1) Steering Mode of the Aircraft From the flight data in the flight recorder, QAR records, and the result of the on-site investigation after the serious incident, the JTSB concludes that when the serious incident occurred, the steering system of the Aircraft most likely stayed in the Handle mode despite pressing down the Handle, and the nosewheel steering was most likely unable to be controlled by the Pedal mode. In addition, this state had been continuing most likely from when the Aircraft was taxiing for the takeoff at New Chitose Airport, the departure aerodrome of the previous flight until the serious incident occurred. Regarding the reason why the Pedal mode was unable to be used, it is certain that the steering mode stayed in the Handle mode due to microswitch abnormality in the Handle, however, the failure had been resolved in the course of disassembly investigation of the microswitch, and after that, the failure could not be reproduced, thus the cause of the abnormality could not be identified even in the detailed investigation. Besides, the flight crew members were probably not able to recognize that the steering system mode stayed in the Handle mode at any point until the serious incident occurred after the takeoff from New Chitose Airport in the previous flight because the flight crew members taxied the Aircraft by use of the Handle until they started taking off from Yamagata Airport where the serious incident occurred and the status at the time of the serious incident would not be displayed as the EICAS messages. (2) Directional Control Regarding the Aircraft veered to the left was more likely caused by either of; the nosewheel of the Aircraft was installed facing to the left, the runway was incline from the centerline toward both sides of the edge, or the Aircraft was receiving a left tailwind, or a combination thereof. Although the flight crew members, who were thinking that the steering mode was in the Pedal mode, tried to change the Aircraft's direction toward the runway centerline applying the right rudder pedal, they were most likely not able to change it because the steering mode stayed in the Handle mode. The Aircraft can also make a takeoff run using the Handle mode in which the range of the controllable steering angle varies depending on the speed. However, it is probable that it was difficult for the flight crew members, who were making the takeoff roll expecting the steering mode was in the Pedal mode, to try to control the direction deciding the use of the Handle mode without delay after they immediately recognized there was an abnormality with the Pedal mode because they could not control the direction. Furthermore, the rudder could not be probably producing the required aerodynamic force to control the Aircraft's direction because its airspeed would have not been enough accelerated although the rudder moved to

respond to the rudder pedal inputs.

(3) Brake Operation at the Time of Rejected Takeoff

The JTSB concludes that the PIC most likely decided to abort the takeoff because he was not able to control the direction of the Aircraft even after applying the maximum input on the right rudder pedal.

The PIC stated that after initiating to abort the takeoff, he judged that it would be impossible to stop the Aircraft within the runway, and did not apply the brakes considering the Aircraft's attitude would be instable after running off the side of the runway.

As a result of the examination using a flight simulator, it is somewhat likely that if the PIC verified that the auto brake was not activated and applied maximum braking in accordance with the procedures stipulated in the AOM after deciding to abort the takeoff, the Aircraft could have stopped within the runway, or its degree could have been reduced even when the Aircraft ran off the side of the runway. However, regarding why the PIC, who was required to decide in a short time, did not apply the brakes to prepare the running off the side of the runway, he more likely took an action according to the circumstances as a PIC.

In addition, the training scenario provided to the operator by the design/manufacturer as a reference did not specify the time of an aborting takeoff, and the company chose the high speed aborting takeoff training, however, it is probable that flight crew members who experience the corresponding methods under various kinds of conditions including at low speed make their decision-making more suitable for applying brakes after aborting takeoff.

(4) Running Off the Side of the Runway

It is highly probable that because the Aircraft could not change its direction while trying to control the nosewheel steering by means of the Pedal mode when it started the takeoff roll, it veered off the runway while aborting takeoff and disabled to move on its own.

(5) How to Check the Steering Mode

The system of the Aircraft and the inspection before departure did not most likely enable the flight crew members to recognize the situation that the steering system stayed in the Handle mode and the Pedal mode was unable to use.

In general, a flight crew member operates an aircraft expecting the steering mode to change normally by pushing the handle. It is probably effective for preventing the recurrence of similar incident that, in the case where the mode in use is different from the intended one, a flight crew member should be able to timely recognize this information.

It is certain that the abnormality in the steering mode, which occurred at the preflight inspection or during the taxi respectively, would be recognized by confirming there is no abnormality in the steering mode through the procedures for the operational check on the flight control system and the Pedal mode works as intended by the flight crew member by operating the

	rudder pedals after starting the taxi as the Manufacturer has stated. However, the confirmation in the Pedal mode cannot always be performed because the Handle mode and the Pedal mode would be used respectively depending on the situation in the steering operation during taxiing. In addition, as the Company describes in the Operating Information, the flight crew members can certainly recognize the abnormality of the steering mode resulted from the abnormality of the microswitch before starting takeoff roll by the method of confirming the aircraft would not move to left and right while rotating the Handle to left and right without pushing down it, and it is certainly effective for preventing the recurrence of the same kind of incident. However, the workload of flight crew members just before a takeoff likely increases by these additional procedures. To prevent recurrence of the same kind of incident, it is desirable for the manufacturers to consider measures that enable flight crew members to timely and easily recognize the abnormality in the steering mode by taking into account the actual operational environment and reviewing systems or procedures.

4. PROBABLE CAUSES

The JTSB concludes that the probable cause of this serious incident was that because the Aircraft could not change its direction while trying to control the nosewheel steering with the Pedal mode when it started takeoff roll, the Aircraft was disabled to move on its own when it stopped in the grass field after running off the side of the runway while aborting the takeoff.

Regarding the reason why the Pedal mode could not control the nosewheel steering, it is highly probable that because there was an abnormality in the microswitch inside the Handle, the steering mode stayed in the Handle mode.

The cause of the microswitch failure could not be determined even in the detailed investigation.

5. SAFETY ACTIONS

(1) Measures taken by the Company

a. The Company issued an Operating Information " Response when occurring an abnormality in the steering system" , and has informed the flight crew members the outline of the steering system and the response at the time when an abnormality would occur in it.

b. The Company provided the flight crew members with the training for a rejected takeoff at low speed in the periodic training of the 2019 fiscal year.

(2) Measures taken by the Manufacturer

The manufacturer has revised the normal procedure in the AOM related to the operational check for the flight control system as below. (Revised on November 6, 2020)

- Added the verification of the displayed status of the EICAS message "STEER OFF" after pushing the steering disengage switch to disengage the rudder pedal and the steering system when starting the operational check for the flight control system as the NOTE (Operating procedures, techniques and other related information, which are considered essential to emphasize the safety of flight.).

Verify the STEER OFF Status message is displayed on EICAS and check it Remains displayed until the Nosewheel Steering Handle is pressed to engage the Steering.

- The procedure to enable the steering to use after completing the operational check for the flight control system.

Before : *Press the NOSEWHEEL STEERING Handle to engage the STEERING*

After : *Press the NOSEWHEEL STEERING Handle until STEER OFF Status message extinguishes to engage the STEERING*