



Internal Memorandum

Date: 11/23/2022

To: Captain Brian J. Pickett, Managing Director, Flight Operations (on behalf of NYC CPO)
Captain Bryan L. Dickerson, Regional Director & Chief Pilot – ATL CPO

From: Captain Kevin L. Carrara

Subject: II22-089: Delta Flight Safety – Mechanical Issue – Potentially “Frozen” Left Aileron
DL211 07JUL22 PRG-JFK N181DN B-767-332 (181)
CAP 1: CARRARA, K.L. (NYC); **CAP 2:** GREENWALD, S.J. (NYC)
FO1: OWENS, M.A. (ATL); **FO2:** BOLZ, M.A.(NYC)

These NTSB responses are provided at the request of Delta Flight Safety through the Chief Pilot’s Office.

I was one of two Captains on Delta Air Lines Flight 211 from PRG-JFK on 07JUL22.

Which pilot first took over manual control of the airplane once the increasing forces were identified? Was control handed off between pilots during the event?

Previous events, not known (I was summoned to the cockpit after initial autopilot disconnection).

Were there points during the flight where both pilots were applying simultaneous inputs to the control wheel and column in the same direction? In opposite directions?

Not that I recall.

After the first autopilot disconnection, we notice a slight but rapid change in control wheel deflection. Do you recall if a pilot had his/her hands on the wheel at this point? From your recollection, was this more likely an autopilot command or a manual one?

Previous events, not known (I was summoned to the cockpit after initial autopilot disconnection).

We see the autopilot being engaged and disengaged multiple times in the FDR data. Can you recall if any of these disconnects may have been manual ones?

When I was not in the cockpit, the autopilot got a degradation warning light. Soon after, it clicked off because it could no longer maintain flight (could not turn left).

When I got to the cockpit, I disconnected it manually and did not engage it again until we solved the issue (autopilot problem vs. flight control problem).

In commenting that the wheel felt jammed, could you be more specific? Below are some examples of things that can help us in the understanding. Feel free to answer these individually, or simply describe the event more generally in an attempt to address as much as you can recall:

Was the wheel completely stuck, or difficult to turn? Did both wheels have the same behavior, and was the behavior the same in both directions?

The yoke acted normally except in the roll mode left of center position. The yoke would not go past the center position to the left heading. For example, if you rolled into a right bank, the yoke would enable you to

come back to neutral control of the roll, but you actually needed to come back past center to the left to take out your right bank – thus you would need to use rudder to take out bank. Conversely, if you had just used the rudder to make a small correction to the left, you could use the yoke to roll out of your left bank will right input.

Was there any “free play” in the wheel movement that may or may not have included aileron motion?

No free play.

Was there any type of specific tactile sensation that seemed peculiar in retrospect (stickiness, etc.)?

No.

Was there any noise associated with the control movements, whenever they did seem to move correctly?

No.

At any time, did the airplane seem to respond differently than expected when the control wheels were moved? Did both wheels behave similarly?

No. Both control wheels behaved identically.

Did you attempt adding any aileron trim in either direction? Did the airplane respond?

No, I don't believe the QRH ever called for trim.

Did the control forces increase in a way that made it seem like total available travel was somehow limited? Did forces increase with deflection?

There were never any “increasing forces.” The yokes would not move left of center; it was like a stop. I never grabbed the yoke to see if I could “overpower” the stop. I may have tried 30 lbs. of force at one time to overcome, but being I had plenty of control of the roll with rudder, I waited for guidance from the QRH and ATL maintenance control to try full bore.

Could you attempt to classify the scale of forces that seemed to be needed – that is, did you need to reposition your hands to get better leverage on the wheel? Did you need to brace your feet? Is there another common force you would compare it to (i.e., driving a car without power steering).

See prior response above.

Did the feel of either or both wheels change as the situation progressed?

Never a progression of feel from either yoke. When it finally freed itself, it was with very light hands on the yoke. Felt a slight “pop.” From that moment on, it was normal yoke.

I acknowledge release of this statement to [Delta Flight Safety](#), the [National Transportation Safety Board \(NTSB\)](#) and to the [Canadian Transportation Safety Board \(TSB\)](#).

Regards,

Captain Kevin L. Carrara
Employee [REDACTED]
(Signature on file)



Internal Memorandum

Date: 10/24/2022

To: Captain Brian J. Pickett, Managing Director, Flight Operations (on behalf of NYC CPO)
Captain Bryan L. Dickerson, Regional Director & Chief Pilot – ATL CPO

From: First Officer Michael A. Owens

Subject: II22-089: Delta Flight Safety – Mechanical Issue – Potentially “Frozen” Left Aileron
DL211 07JUL22 PRG-JFK N181DN B-767-332 (181)

CAP 1: CARRARA, K.L. (NYC); **CAP 2:** GREENWALD, S.J. (NYC)

FO1: OWENS, M.A. (ATL); **FO2:** BOLZ, M.A.(NYC)

These NTSB responses are provided at the request of Delta Flight Safety through the Chief Pilot’s Office.

I was one of two First Officers on Delta Air Lines Flight 211 from PRG-JFK on 07JUL22.

Which pilot first took over manual control of the airplane once the increasing forces were identified? Was control handed off between pilots during the event?

First Officer Owens (myself) was the pilot flying. Controls were handed off between pilots to allow both pilots to verify the jam.

Were there points during the flight where both pilots were applying simultaneous inputs to the control wheel and column in the same direction? In opposite directions?

I do not remember such an event.

After the first autopilot disconnection, we notice a slight but rapid change in control wheel deflection. Do you recall if a pilot had his/her hands on the wheel at this point? From your recollection, was this more likely an autopilot command or a manual one?

I believe I had my hand on the controls when I disconnected the autopilot to maintain control. I do not remember a control wheel deflection immediately after disconnecting the autopilot. After discovering the jam, I did put in a slight right roll reflection to check if the jam was in both directions.

We see the autopilot being engaged and disengaged multiple times in the FDR data. Can you recall if any of these disconnects may have been manual ones?

I believe all of the autopilot disconnects were manual. We only received the caution message for the degraded autopilot condition and did not receive the warning message for the autopilot disconnecting automatically.

In commenting that the wheel felt jammed, could you be more specific? Below are some examples of things that can help us in the understanding. Feel free to answer these individually, or simply describe the event more generally in an attempt to address as much as you can recall:

Was the wheel completely stuck, or difficult to turn? Did both wheels have the same behavior, and was the behavior the same in both directions?

The wheel was almost completely stuck to the left and only had a small amount of deflection to the right.

Was there any “free play” in the wheel movement that may or may not have included aileron motion?

I would say that there was a little bit of free play to the right but not any to the left.

Was there any type of specific tactile sensation that seemed peculiar in retrospect (stickiness, etc.)?

If I held pressure to the left, it had a feel similar to compressing ice. Nearly imperceptible movement.

Was there any noise associated with the control movements, whenever they did seem to move correctly?

There seemed to be a bit of a 'thunk' when normal control was finally restored.

At any time, did the airplane seem to respond differently than expected when the control wheels were moved? Did both wheels behave similarly?

It seemed that both wheels behaved similarly and as expected given the situation.

Did you attempt adding any aileron trim in either direction? Did the airplane respond?

I did not.

Did the control forces increase in a way that made it seem like total available travel was somehow limited? Did forces increase with deflection?

The available travel seemed nearly completely restricted, hence the jam. The forces did not increase with deflection. They were just stuck.

Could you attempt to classify the scale of forces that seemed to be needed – that is, did you need to reposition your hands to get better leverage on the wheel? Did you need to brace your feet? Is there another common force you would compare it to (i.e., driving a car without power steering)?

In an effort to roll the aircraft left to stay on course, I applied more pressure than is needed to drive my 1 ton truck when the power steering goes out. Little if any roll was achieved when this was applied.

Did the feel of either or both wheels change as the situation progressed?

While I was pilot flying there was no noticeable change.

I acknowledge release of this statement to [Delta Flight Safety](#), the [National Transportation Safety Board \(NTSB\)](#) and to the [Canadian Transportation Safety Board \(TSB\)](#).

Regards,

First Officer Michael A. Owens
Employee [REDACTED]
(Signature on file)

Supplemental Pilot Statement (NTSB)

Captain Stu Greenwald

Add'l NTSB Questions: II22-089 - DL Flight Safety - Mech Issue - Potential Frozen Aileron – DL211 07JUL22 PRG-JFK

1. *Which pilot first took over manual control of the airplane once the increasing forces were identified? Was control handed off between pilots during the event?*

Initially, FO Mike Owens was the PF w/ the center autopilot engaged. I (Capt Greenwald, LCA) was PM in the left seat. When the a/p disengaged I suggested he attempt to reselect it. When it disconnected a second time, I suggested he try engaging the R autopilot. When that disengaged after several seconds I also suggested he try the L autopilot which was also unsuccessful. As he was hand flying he identified the airplane's inability to turn left (which was the culprit for the three autopilot's inability to remain engaged w/ a crosswind as it could not maintain track.). When he identified this issue I took control of the airplane to verify and after confirmation the controls were handed back in order to run the QRH checklist.

2. *Were there points during the flight where both pilots were applying simultaneous inputs to the control wheel and column in the same direction? In opposite directions?*

We each attempted to apply left force to the control wheel. I do not recall at what point we both attempted this (per the QRH). Right, forward, and aft forces were irrelevant as those axis' operated normally.

3. *After the first autopilot disconnection, we notice a slight but rapid change in control wheel deflection. Do you recall if a pilot had his/her hands on the wheel at this point? From your recollection, was this more likely an autopilot command or a manual one?*

After the disconnection of the first autopilot, deflection was manually input to determine the airplane's abilities. Left deflection was impossible. Any right, forward or aft input, if abrupt, was a result of the change of axis input following considerable unsuccessful left input.

4. *We see the autopilot being engaged and disengaged multiple times in the FDR data. Can you recall if any of these disconnects may have been manual ones?*

They were not manual disconnects by the pilots. As we evaluated the issue we attempted a few reengagements. This process was repeated when the relief crew was brought back to the flight deck to assist in troubleshooting and to demonstrate the issue.

Supplemental Pilot Statement (NTSB Report)

Captain Stu Greenwald

Add'l NTSB Questions: II22-089 - DL Flight Safety - Mech Issue - Potential Frozen Aileron –
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5. *In commenting that the wheel felt jammed, could you be more specific? Below are some examples of things that can help us in the understanding. Feel free to answer these individually, or simply describe the event more generally in an attempt to address as much as you can recall:*
- a. *Was the wheel completely stuck, or difficult to turn? Did both wheels have the same behavior, and was the behavior the same in both directions?*
 - b. *Was there any “free play” in the wheel movement that may or may not have included aileron motion?*
 - c. *Was there any type of specific tactile sensation that seemed peculiar in retrospect (stickiness, etc.)?*
 - d. *Was there any noise associated with the control movements, whenever they did seem to move correctly?*
 - e. *At any time, did the airplane seem to respond differently than expected when the control wheels were moved? Did both wheels behave similarly?*
 - f. *Did you attempt adding any aileron trim in either direction? Did the airplane respond?*
 - g. *Did the control forces increase in a way that made it seem like total available travel was somehow limited? Did forces increase with deflection?*
 - h. *Could you attempt to classify the scale of forces that seemed to be needed – that is, did you need to reposition your hands to get better leverage on the wheel? Did you need to brace your feet? Is there another common force you would compare it to (i.e., driving a car without power steering).*
 - i. *Did the feel of either or both wheels change as the situation progressed....*

Responses:

- a) The control wheel was 99% stuck and unable to turn left. A considerable amount of force was required to turn it the minimal amount it would take to the left to almost maintain heading.
- b) There was MINIMAL free play to the left; not enough to maintain heading.
- c) Both wheels had the same limits and operated in the same manner. It was stuck and could not turn left. The control wheel was normal in the right, forward and aft axis.
- d) There was no noise associated with any control wheel movements.
- e) The wheels operated as expected and normally to the right, forward and aft.
- f) I do not recall any trim being utilized.
- g) Forces were consistent when attempting to turn to the left: impossible to move. Neither wheel could overpower the jam. Both sides felt identical; I was the only crew member to have been in both seats during the event.

Supplemental Pilot Statement (NTSB Report)

Captain Stu Greenwald

Add'l NTSB Questions: II22-089 - DL Flight Safety - Mech Issue - Potential Frozen Aileron –
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- h) Feet were braced on the floor as we attempted to maintain the considerable amount of force needed to keep a slight left force and some semblance of maintaining heading. When relaxed the airplane would drift right.
- i) Feel did not change as the situation progressed, until the moment the ice melting occurred. The controls freed up during the decent, and all four axis were totally normal after that point.

Supplemental Pilot Statement (NTSB)

First Officer Michael Bolz

Add'l NTSB Questions: II22-089 - DL Flight Safety - Mech Issue - Potential Frozen Aileron – DL211 07JUL22 PRG-JFK

1. *Which pilot first took over manual control of the airplane once the increasing forces were identified? Was control handed off between pilots during the event?*

I came up to the cockpit and found both Captains at the (manual) controls of the airplane. And yes, control was handed off between pilots during the event.

2. *Were there points during the flight where both pilots were applying simultaneous inputs to the control wheel and column in the same direction? In opposite directions?*

I cannot answer this question with certainty. I can say that when I was at the controls for a brief moment, the other pilot in the control seat was not applying any inputs, not same or opposite. While I was in the seat at the controls, I was the only one applying input to the controls.

3. *After the first autopilot disconnection, we notice a slight but rapid change in control wheel deflection. Do you recall if a pilot had his/her hands on the wheel at this point? From your recollection, was this more likely an autopilot command or a manual one?*

I was not in the cockpit at this time, so I cannot speak to that.

4. *We see the autopilot being engaged and disengaged multiple times in the FDR data. Can you recall if any of these disconnects may have been manual ones?*

I don't recall being in the cockpit when any of these engage/disengage evolutions occurred.

5. *In commenting that the wheel felt jammed, could you be more specific? Below are some examples of things that can help us in the understanding. Feel free to answer these individually, or simply describe the event more generally in an attempt to address as much as you can recall:*
 - a. *Was the wheel completely stuck, or difficult to turn? Did both wheels have the same behavior, and was the behavior the same in both directions?*
 - b. *Was there any "free play" in the wheel movement that may or may not have included aileron motion?*
 - c. *Was there any type of specific tactile sensation that seemed peculiar in retrospect (stickiness, etc.)?*

Supplemental Pilot Statement (NTSB Report)

First Officer Michael Bolz

Add'l NTSB Questions: II22-089 - DL Flight Safety - Mech Issue - Potential Frozen Aileron –
DL211 07JUL22 PRG-JFK

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- d. Was there any noise associated with the control movements, whenever they did seem to move correctly?*
- e. At any time, did the airplane seem to respond differently than expected when the control wheels were moved? Did both wheels behave similarly?*
- f. Did you attempt adding any aileron trim in either direction? Did the airplane respond?*
- g. Did the control forces increase in a way that made it seem like total available travel was somehow limited? Did forces increase with deflection?*
- h. Could you attempt to classify the scale of forces that seemed to be needed – that is, did you need to reposition your hands to get better leverage on the wheel? Did you need to brace your feet? Is there another common force you would compare it to (i.e., driving a car without power steering).*
- i. Did the feel of either or both wheels change as the situation progressed....*

Responses:

- a) The controls were only "stuck" when left aileron movement was commanded. I only had input on the right side (FO side) so I don't know if both wheels had similar behavior. The behavior was not the same in both directions. No movement was allowed to the left, and full movement was possible to the right. In addition, full movement up and down (pitch) was possible, as well as yaw left and right (from the rudder pedals). Only the aileron (roll) to the left was inhibited.
- b) No, not that I recall.
- c) No, just the inability to move the control wheel to the left.
- d) Not that I recall.
- e) Other than the fact that the control wheel (FO side, right side) did not move at all to the left, no other unexpected responses were felt. I only manipulated the right side controls, so I cannot speak to the part about both wheels behaving similarly.
- f) I did not attempt to add any aileron trim.
- g) No, they did not increase or decrease while I was at the controls. It was a constant lack of movement to the left. They did not increase with deflection.
- h) No additional scale of force needed in hands or feet. A normal scale of force was needed.
- i) No. While I was at the controls, total/free movement was possible to the right, no movement allowed to the left. This was constant during the time I was at the controls.