



Doug Brazy
Sr. Aviation Accident Investigator
AS-10

Date: 9/6/24

Subject: DCA24MA063 Alaska Airlines Flight 1282
Boeing 737-9, N704AL
Left Mid Exit Door Plug Separation in Portland, OR
January 5, 2024
Investigative Hearing – Follow-up Answers

During the investigative hearing, some questions required follow up action to provide answers or elaborate. The questions and issues were provided to witnesses/parties after the hearing, the responses are attached.

<end>

06 September 2024
66-CB-H220-ASI-19366

Doug Brazy
Senior Aviation Accident Investigator / Hearing Officer
National Transportation Safety Board
Office of Aviation Safety
Air Carrier and Space Investigations Division (AS-10), Room 5349
490 L'Enfant Plaza East, SW
Washington, DC 20594-0003



Subject: Boeing Response to NTSB Callback Questions – Alaska Airlines 737-9
N704AL Decompression in Portland, Oregon on 5 January 2024

References: (a) Email, 19 August 2024, NTSB to Boeing, Re: (AS1282 Hearing)
"Callback" Questions - Due Date COB Friday Sept 6
(b) Email, 19 August 2024, NTSB to Boeing, (AS1282 Hearing) Transcripts
for your Review - Due Date COB Friday Sept 6

Dear Mr. Brazy:

In response to the reference (a) correspondence, Boeing is providing responses to the NTSB Hearing callback questions as an enclosure to this letter. Within the enclosure, Boeing has quoted the questions as stated in reference (b) transcripts to document those questions paraphrased in the attachment to reference (a) email.

The information included with this correspondence is controlled under the US Export Administration Regulations (15 CFR Parts 300-799) and has been categorized as ECCN: 9E991.

Please feel free to contact us if you have any questions.

Best regards,

[Redacted Signature]
Stella B. Weidner
Director, Product Safety

Enclosure: Boeing Response to NTSB Callback Questions – Alaska Airlines 737-9
N704AL Decompression in Portland, Oregon on 5 January 2024

cc: John Lovell, NTSB Office of Aviation Safety, Investigator-in-Charge

PANEL 1

Q1: “Can you share a little more information as I’m not an expert on the mid exit, about who made the design decision not to have a backup or redundancy where that door has a single point of failure essentially?” Aug. 6 Tr. 120:17–21 (AFA):

A1: Spirit designed the Mid Exit Door (MED) Plug. Engineering changes that affect the MED Plug are the responsibility of Spirit. Boeing reviews major changes.

Boeing does not agree that the MED plug design has a single point of failure. The MED plug design is discussed in detail in the Structures Group Chair’s Factual Report at 4–6, 14–15. As stated in the report,

[I]f only one vertical movement arrestor bolt is installed in a hinge assembly, then the other vertical movement arrestor bolt and both upper guide track bolts are not needed to ensure the plug remains in place. If no vertical movement arrestor bolts are installed in the hinge assemblies, then both of the upper guide track bolts are required to ensure the plug remains in place.

Structures Group Chair’s Factual Report at 14–15.

PANEL 2

Q2 “[D]oes Boeing provide guidance to operators and contract maintenance for what lubricant to use when closing the MED door plug after maintenance for the Max-9, and the 737-900-ER?” Aug. 6 Tr. 236:1–4 (AFA).

A2: The 737 Aircraft Maintenance Manual (AMM) calls for lubricant (soap) to be used to help operators install the MED plug door seal within its seal retainer. It also identifies a product specification for a soap compatible with the seal. The AMM does not direct operators to use a lubricant when simply closing the MED plug.

A lubricant (soap) is used in production to assist in the MED plug’s installation and initial adjustment process. This process may require multiple operations of the plug and higher plug forces than those seen in-service. The seal lubricant reduces the effort required to close the door when the higher forces are present. Boeing has not found that in-service maintenance personnel have required or requested the use of lubricant during MED plug closure.



PANEL 3

Q3: “Mr. Silva, you stated that the [MED] plug defect should have been caught after it occurred or when rollout occurred. What rollout inspection would have caught this defect, which we understand may have been covered under the insulation blanket at that stage?” Aug. 7 Tr. 163:2–6 (AFA).

A3: Mr. Silva’s prior testimony on this point indicated that the MED door plug issue should have been identified prior to rollout:

I’d say the -- as we discussed yesterday throughout Panels One and Two, and I don’t have the -- we can certainly pull up a timeline. But typically, that escape should have been caught either within that time range for the removal to be written, and to have that documentation, or at the absolute latest, prior to the rollout of the airplane.

Aug. 7 Tr. 53:16-21. As discussed during the hearing, there are several inspections relating to the MED plug during Boeing’s manufacturing process, including the following processes:

- OK to Install Blankets (Flow Day 1)
- MED plug rigging check (Flow Day 1–3)
- Fuselage pressure testing (Flow Day 7)
- MED plug “Fit and Fair” check (Flow Day 9)
- Pre-flight pressure test (aircraft outside)

In addition, if the MED plug is removed during the manufacturing process at Boeing, the removal process would require re-inspection of the installation hardware to confirm that it meets engineering requirements. *See also, e.g.,* Aug. 6 Tr. 142:16–143:7 (Lund), 230:17–231:6 (Lund), 231:11–17 (Lund).

Q4: “I think our concern at looking at it, that [the oxygen generators] could also just be activated and then not be available when needed. Because if they migrate too far, it can pull the fire ring and -- yeah.” Aug. 7 Tr. 164:19–22 (AFA).

A4: The effects arising from the issue involving the Passenger Service Units and the oxygen generators were evaluated thoroughly as part of Boeing’s continued operational safety review process with the FAA. Boeing determined that a personal safety issue exists and issued service bulletins to correct the condition. *See also, e.g.,* Aug. 7 Tr. 163:21–25 (Wright), 164: 1-4 (Wright).



Boeing Response to NTSB Callback Questions

Alaska Airlines 737-9 N704AL Decompression in Portland, Oregon on 5 January 2024

- Q5: “[W]ere the carriers notified to make them aware of this potential hazard [relating to the oxygen generators]?” Aug. 7 Tr. 165:1–2 (AFA).
- A5: Yes, Boeing advised operators through fleet team meetings, a fleet team digest article, multi-operator messages, and service bulletins.
- Q6: (Referring to the flight attendants’ actions during the accident) “How do we get good lessons like that, where a protocol was written with good intentions, but real lessons are learned. One operator has made the change. How do you get that information out to other operators?” Aug. 7 Tr. 200:6–10 (Member Inman).
- A6: Boeing typically incorporates lessons learned from in-service events and operator feedback and data through changes to applicable Boeing’s manuals. These types of updates are communicated to operators through revision changes to the Boeing manuals, service bulletins, fleet and operator engagements, fleet team digest articles, and/or multi-operator messages as required. This often is a result of Boeing’s Continued Operational Safety Program and subject to FAA oversight.
- Q7: (Referring to the Boeing employees whose compensation has recently been tied more significantly to quality) “Do you have an idea how big that universe is?” Aug. 7 Tr. 210:22–23 (Member Inman).
- A7: Boeing prioritizes safety and quality when evaluating employee performance and compensation. Employee performance and behaviors impacting product safety are a focus area for individual performance evaluations that influence annual base compensation decisions. Boeing incentive plans include a mix of operational and financial goals, including safety and quality metrics. For the majority of Boeing Commercial Airplanes employees (not just managers and executives), 60% of their applicable incentive plan score is weighted towards safety and quality performance. All other Boeing employees likewise have similar safety and quality metrics built into their incentive plans, although the details of those plans may differ among business units, job responsibilities, and locations. All employees must complete the mandatory product safety (SMS) and quality management training on an annual basis to receive an incentive payment.
- Q8: “I would ask, because I know some of this could be proprietary data, but I would ask if the [IIC] was to ask for some of those metrics [regarding financial resources for the organizations led by Mr. Ackerman, Mr. Silva, and Mr. Wright], or kind of how you were establishing that, would you be willing to discuss at least letting that be seen, even if it’s on the OUO, which is redacted?” Aug. 7 Tr. 214:15–19 (Member Inman).
- A8: The organizations led by Doug Ackerman and Hector Silva are part of Boeing’s Total Quality organization. From 2020 to 2024, the headcount and funding in the Total Quality organization increased every year. Overall, headcount in that



organization has increased since 2020 by more than 50% while the funding has more than doubled.

With respect to the Boeing's Safety Management System (SMS) organizations that include Paul Wright, Boeing's enterprise-wide headcount in the SMS organization has increased approximately 20% since 2021 and the funding for the SMS Core and SMS Promotion organizations has almost doubled.



Q9: “[T]here’s a standard [for the decompression regulations] that’s set at 820 inches. The door plug is 1,682 inches. It’s pretty obvious if there’s going to be an opening, the likely opening would be a door plug or a door. We’re hearing a lot of incidents where people are trying to open doors. But we haven’t set the standard to the size of the door. ... If anyone has an opinion on it, you can feel free to state it or not.” Aug. 7 Tr. 218:7–23 (Member Inman).

A9: Boeing defers to the FAA on this question.

Q10: Please provide: (1) “the production rates in Renton by line by month over the last 10 years” and (2) “employee counts in Renton by month over the last 10 years.” (New question from Chair Homendy).

A10: Given the confidentiality of this proprietary data, Boeing has provided this data in letter 66-CB-H220-ASI-19363.

PANEL 4

Q11: “[Y]ou do a risk assessment, and you come up with a risk score. ... And what are the inputs to that? What is the score based on?” Aug. 7 Tr. 293:5–9 (Chair Homendy).

A11: Boeing defers to the FAA on this question.

Q12: “[Y]ou said there are some [audits] that require notice, doesn't always have to be notice. Before this accident, how many per year would you do with no notice?” Aug. 7 Tr. 293:22–24 (Chair Homendy).

A12: Boeing defers to the FAA on this question.

Boeing Response to NTSB Callback Questions

Alaska Airlines 737-9 N704AL Decompression in Portland, Oregon on 5 January 2024

Q12a: “Produce (1) ‘the number of ANNOUNCED principal inspection audits by month over the last 10 years’ and (2) ‘separately, UNANNOUNCED?’”
(New question from Chair Homendy).

A12a: Boeing defers to the FAA on this question.

Q13: “The FAA runs two programs, right, a hotline and a whistleblower program. ... How are those two different? ... Can you give me a little bit of specifics like how -- or is that complicated?” Aug. 7 Tr. 297:5-12 (Member Graham).

A13: Boeing defers to the FAA on this question.

Q14: “when you do enforcement and there is a fine, is there a settlement process at some point between Boeing and FAA? ... And are there standards for that type of settlement?” Aug. 7 Tr. 313:14–21 (Chair Homendy).

A14: Boeing defers to the FAA on this question.



BOEING



U.S. Department
of Transportation
**Federal Aviation
Administration**

Memorandum

Date: September 6, 2024

To: John Lovell, NTSB Investigator In Charge, and;
Doug Brazy, NTSB Public Hearing Officer

From: Matthew Rigsby, FAA Party Coordinator

Subject: Alaska Airlines Flight 1282 – NTSB Hearing Follow-up

Summary

During the first day of the hearing, FAA received five questions that required follow-up answers to the NTSB.

Question 1 to FAA:

5:50:20 (paraphrasing) How are the “hole sizes” determined for certification for withstanding a decompression/depressurization. The certification hole size is smaller than the size of a door or door plug. Any comments on this?

https://youtu.be/EZuO2dtGVXo?si=mJKOcsT1c_xlMo2F&t=21020

Answer:

The structural requirements associated with a decompression event are specified in Title 14, Code of Federal Regulations (14 CFR) 25.365(e). Section 25.365(e) requires the airplane be capable of continued safe flight and landing following a sudden release of pressure (sudden decompression) through an opening in any compartment.

The certification basis for the Boeing Model 737-9 includes:

Sec. 25.365

(e) Any structure, component or part, inside or outside a pressurized compartment, the failure of which could interfere with continued safe flight and landing, must be designed to withstand the effects of a sudden release of pressure through an opening in any compartment at any operating altitude resulting from each of the following conditions:

(1) The penetration of the compartment by a portion of an engine following an engine disintegration:

(2) Any opening in any pressurized compartment up to the size H_0 in square feet; however, small compartments may be combined with an adjacent pressurized compartment, and both considered as a single compartment for openings that cannot be reasonably be expected to be confined to the small compartment. The size H_0 must be computed by the following formula:

$$H_0 = PAs$$

where,

H_0 = Maximum opening in square feet, need not exceed 20 square feet.

$$P = (As/6240) + .024$$

As = Maximum cross-sectional area of the pressurized shell normal to the longitudinal axis, in square feet; and

(3) The maximum opening caused by airplane or equipment failures not shown to be extremely improbable.

Of the three-hole sizes specified in § 25.365(e), the “formula hole size” specified in § 25.365(e)(2) is usually the largest and therefore most critical. The formula prescribes a maximum decompression hole size of 20 square feet for wide-body airplanes, and varies based on cross-sectional area of the fuselage. For the Boeing Model 737-9 fuselage, the formula hole size is equal to 820 square inches (5.7 square feet), and this is the decompression hole size the airplane was designed to withstand.

The formula hole size is not intended to cover any specific event or failure, but to establish a certain level of decompression capability. Transport category airplanes are not designed to withstand the loss of a door. The loss of any door is generally considered extremely improbable, due to door design requirements and features, and is therefore not evaluated as part of the decompression analysis.

When establishing the new requirements for the formula hole size in § 25.365(e) (codified in Amendment 25-54), the FAA specifically determined that door integrity could be improved such that designing an airplane for a decompression event associated with the loss of a door was not justified. Indeed, the FAA later upgraded the door design requirements of § 25.783 (14 CFR part 25 at Amendment 25-114).

Question 2 to the FAA:

7:53:45 (Paraphrasing) Regarding FAA inspections that include risk assessments; please provide a list of which elements (questions) are evaluated/assessed that ultimately comprise the “risk score”.

<https://youtu.be/EZuO2dtGVXo?si=ll8OzNV9hhZzegT6&t=28425>

Answer:

From FAA Order 8120.23A, Change 1, *Certificate Management of Production Approval Holders*, the following indicators are used for Risk-based Resource Targeting (RBRT) decision making associated with oversight (inspection) of a Production Approval Holder (PAH):

Step 1 - Exposure to the National Airspace System level determination (Levels 1 through 3) questions

Level 1 Determination Decision (Note: The applicant must meet all three of the question criteria or use the option listed below) Question #1: <i>Does PAH produce annually more than 100 Aircraft, 500 Engines (to include rebuilt engines), or 1500 Propellers?</i> Question #2: <i>Does the PAH have 2 or more models in production?</i> Question #3: <i>(a) Does the PAH have 20 or more external suppliers of critical parts/major assemblies</i> or <i>(b) Outsource 33% or more critical parts/major assemblies</i> [OR] Option: The manager of the manufacturing managing office is empowered to move the status of a PAH to or from a LEVEL 1 or 2 with written rationale.

Step 2 – Organizational risk determination questions

After the risk level is determined, the risk is evaluated using questions contained in the FAA's Aircraft Certification Audit Information System, which is a tool used by FAA offices in conducting evaluations, audits, and inspections of PAHs. Level 1 and Level 2 PAHs are evaluated through a set of 18 questions, while Level 3 PAHs are evaluated with 5 questions, which are a subset of the 18 questions. Those questions are divided into two categories: Organizational Ratings and Technical Ratings. Those categories are further grouped into several subcategories with a range of 1 to 4 questions in each subcategory as follows:

1. Organizational Ratings
 - a. Quality System
 - i. Configuration Management
 - ii. PAH Nonconformance Analysis
 - iii. PAH First Article Inspection
 - iv. Internal Audit
 - b. Supplier/Outsourcing
 - i. Supplier Changes
 - ii. Engineering Design Outsourcing
 - iii. Inspection Outsourcing
 - iv. Design Data Control
 - c. Organizational Stability
 - i. Workforce Changes
 - ii. Key Management Changes
 - d. Relationship with FAA
 - i. FAA Relationship
 - e. Compliance History
 - i. Compliance and Enforcement Actions
 - ii. PAH Show Compliance
2. Technical Ratings

- a. Complexity
 - i. PAH Production Complexity
- b. Service Experience
 - i. Quality Escape Events
 - ii. Airworthiness Actions
 - iii. Reportable Quality Escape Events
- c. New/Emerging Technology
 - i. PAH use of New Emerging Technology

Question 3 to the FAA:

7:54:50 (Paraphrasing) before the accident, how many inspections/audits at Boeing would occur per year, with no notice? Following the hearing, the Chair elaborated on the requested information by email and asked for the following:

- (1) “...the number of ANNOUNCED principal inspection audits by month over the last 10 years and,”
- (2) “...separately, UNANNOUNCED?”

<https://youtu.be/EZuO2dtGVXo?si=Z-i7tvXNQ2Jnd-Vj&t=28490>

Answer:

We do not keep separate data on the announced versus unannounced audits. Prior to the accident we conducted, on average, the following numbers of audits per year:

- PI Audits = 148
- SCA Audits = 70
- QSA Audits= 5

Question 4 to the FAA:

07:59:00 (Paraphrasing) please provide the details about the FAA Hotline and Whistleblower programs, how are they different?

<https://youtu.be/EZuO2dtGVXo?si=Z-i7tvXNQ2Jnd-Vj&t=28740>

Answer:

The FAA’s Office of Audit and Evaluation (AAE) manages the FAA Hotline & Whistleblower Information System (FHWIS). FHWIS is a web-based application used for tracking voluntary reports and complaints related to unsafe or unauthorized aviation activities that violate FAA regulations, orders, or any other provision of Federal law related to aviation safety, fraud, waste, abuse, misconduct or mismanagement related to FAA programs, personnel, organizations or facilities or safety disclosures made in conjunction with the Wendell H. Ford Aviation and Reform Act for the 21st Century (AIR21). Reports and complaints are accepted for evaluation from FAA employees or contractors, air carrier employees, the aviation community, law enforcement, and members of the public. Anonymous reports are accepted, unless they are filed as an AIR21 disclosure, which require the identity of the person filing the report.

[FAA Hotline—Report Issues Related to Aviation Safety or FAA Personnel and Facilities](#)

The FAA Hotline accepts reports related to the safety of the National Airspace System, violation of a Federal Aviation Regulation ([Title 14 CFR](#)), aviation safety issues, and reports related to FAA employees or FAA facilities. The FAA Hotline provides a single venue

for FAA employees, the aviation community and the public to file their reports. Hotlines are referred to the FAA organization with oversight or responsibility of the matter reported.

The FAA Hotline does not accept certain types of reports. If we receive these types of reports, you may not receive a response from our office, or these matters may be redirected to the appropriate FAA office. Reports may be submitted online, mail, or by phone.

[AIR21 Whistleblower Protection Program](#)

The Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (AIR21) prohibits discrimination against employees of U.S. air carrier industry and U.S. manufacturers who report information related to air carrier safety. Only employees of U.S. air carriers and U.S. aircraft/component manufacturers, their contractors, and their sub-contractors are covered under the AIR21 Whistleblower Protection Program. Other individuals should file complaints or safety reports using the [FAA Hotline](#). FAA employees may either file complaints through the FAA Hotline or through the [internal whistleblower program](#), if applicable.

Individuals who are covered under AIR21 can [file a complaint with the Department of Labor's Occupational Safety and Health Administration](#) (OSHA) for retaliation, discharge, or otherwise being discriminated against for providing information relating to air carrier safety violations to their employer or to the Federal Government. This includes testifying or assisting in a proceeding against the employer relating to a violation or alleged violation of any order, regulation, or standard of the Federal Aviation Administration or any other Federal law relating to air carrier safety.

Note: The FAA only investigates alleged safety violations. OSHA investigates and rules on the actual job discrimination allegations.

Question 5 to the FAA:

8:22:50 (Paraphrasing) What are the standards for a settlement between the FAA/Boeing when/ if a settlement occurs after an enforcement action which includes a fine?

<https://youtu.be/EZuO2dtGVXo?si=l12MxNEhv4gVj6b8&t=30170>

Answer:

The standards for a settlement agreement can be found in FAA Order 2150.3C, Chapter 8, 29. Settlements are typically executed by AGC-300 and are coordinated with the program office where practicable.

- 29.a. Cases are closed after the terms of a settlement are fully completed.
- 29.d. The settlement has to be in writing.
- 29.b. In general, settlement agreements will have the following elements:
 - Specific terms and conditions of the agreement;
 - Terms/phrases if needed;
 - For a civil penalty, it specifies the exact amount of the penalty, whether it will be paid in a lump sum or installments, and for installments, when those are due and must be accompanied by a promissory note;

- If there is a sanction waiver under the Aviation Safety Reporting Program (ASRP), this is specified; [this could not possibly be applicable to Boeing, of course]
- If the case is a civil penalty letter [where we don't have the authority to make a finding of violation without DOJ involvement] the agreement states, if applicable, that the violator agrees that the violations will count for purposes of future sanction determinations;
- It specifies who will bear any costs incurred;
- It specifies that the violator may not seek fees or costs from the FAA;
- It specifies that the violator waives any cause of action against the FAA or its employees;
- It emphasizes the legally binding nature of the document.

Reference:

https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1034329