

UNITED STATES OF AMERICA

NATIONAL TRANSPORTATION SAFETY BOARD

* * * * *

Investigation of: *

*

ALASKA AIRLINES BOEING 737-9 *

MAX LEFT MID-EXIT DOOR PLUG * Accident No.: DCA24MA063

SEPARATION NEAR PORTLAND, *

OREGON ON JANUARY 5, 2024 *

*

* * * * *

National Transportation Safety Board
Office of Administrative Law Judges
490 L'Enfant Plaza East, Southwest
Washington, D.C. 20594

Tuesday,
August 6, 2024

The above-entitled matter came on for hearing,
pursuant to notice at 9:00 a.m. Eastern Time.

BEFORE: CHAIR JENNIFER HOMENDY

FREE STATE REPORTING, INC.
Court Reporting Transcription
D.C. Area 301-261-1902
Balt. & Annap. 410-974-0947

APPEARANCES:

JENNIFER HOMENDY, Chair
DOUG BRAZY, Hearing Officer
JOHN LOVELL, Investigator-in-Charge
POCHOLO CRUZ, Technical Panel
NILS JOHNSON, Technical Panel
SABRINA WOODS, Technical Panel
MICHAEL GRAHAM, Board Member
TOM CHAPMAN, Board Member
ALVIN BROWN, Board Member
TOM INMAN, Board Member
National Transportation Safety Board

SETH HEIPLE, AFA Air Safety, Health, and Security Chair
AFA Party Coordinator
Alaska Airlines

CAPTAIN STEVE JANGELIS, Aviation Safety Chair
ALPA

JON HOLDEN, President & Directing Business
Representative
IAM District 751

MAX TIDWELL, Vice President, Safety and Security
Alaska Airlines

HEATHER MEYER, Vice President of Quality
Spirit AeroSystems

DAVID GERLACH, Manager of Office of Accident
Investigation
Federal Aviation Administration

<u>ITEM</u>	<u>I N D E X</u>	<u>PAGE</u>
Interview of Terry George, Scott Grabon, Elizabeth Lund, Doug Ackerman, Lloyd Catlin, and Michael Riney:		
By Mr. Cruz		26
By Dr. Woods		36
By Mr. Johnson		37
By Mr. Heiple		105
By Mr. Gerlach		108
By Mr. Holden		111
By Ms. Meyer		116
By Capt Jangelis		120
By Member Chapman		141
By Member Brown		145
By Member Inman		148
By Member Graham		156
By Mr. Tidwell		230

P R O C E E D I N G

(10:00 a.m.)

CHAIR HOMENDY: Good morning. We're now in session. I'm Jennifer Homendy, and I'm honored to serve as chair of the National Transportation Safety Board and chair of this Board of Inquiry. I'm joined by my fellow board members, Member Michael Graham, Member Tom Chapman, Member Alvin Brown, and Member Todd Inman.

Together we comprise the board of inquiry for this investigative hearing, the notice for which was published in the Federal Register on July 25th, 2024. Mr. Brazy, our hearing officer, please start us off with a safety briefing.

MR. BRAZY: Thank you, Chair Homendy. If you have not already done so, please silence your electronic devices. The address of our boardroom is 429 L'Enfant Plaza Southwest, Washington, D.C. There are approximately 150 attendees here today. Restrooms are located in the lobby to the left as you are exiting the boardroom.

In the event of an emergency, we have designated NTSB personnel, we have designated NTSB personnel to certain roles. Please stand as I call your name and remain standing until the conclusion of the safety briefing. Kim LeBaron (ph.) will call 911. Ben Adler (ph.) will meet emergency personnel outside of the front doors. There is a defibrillator in the lobby just outside the doors in front of me. Elias Kontanis will retrieve it if

1 needed. Sabrina Woods is trained and willing to use the device.
2 Lorenda Ward is trained and willing to perform CPR.

3 Fire extinguishers are located near all exits, two behind the
4 dais down the stairs, two at the back of the boardroom where you
5 entered and one by security. Deidre Estes will run and retrieve
6 one if needed. There's also a first aid kit in conference room A.
7 This is the room closest to the security area. The kit is on the
8 counter in a blue pouch and Donna Schultze will retrieve it if
9 needed. Next slide, please.

10 If there is a need to evacuate for any reason, please follow
11 Rochelle McAllister, who will lead you to the exit room and will
12 be wearing a yellow vest. Please walk quickly. Don't run. At
13 the rear of the auditorium, go out the doors, proceed to the
14 lobby, through the lobby, past security. Go up the stairs and
15 exit straight ahead through the glass doors to the outside.

16 Once outside, turn left and follow the sidewalk to the end of
17 the street, which is our rally point. Please do not return to the
18 boardroom until instructed to do so. Next slide.

19 The wheelchair accessible exit instructions are as follows:
20 Kelly Hessler will lead you to the exit route. She will also be
21 wearing a yellow vest. Go out the doors, proceed through the
22 lobby, past security. Immediately turn left and exit through the
23 door, which will take you into the parking garage.

24 To exit the garage, turn right and proceed up the ramp. Once
25 outside, turn left and follow the sidewalk to the end of the

1 street, which is our rally point.

2 That the unthinkable occur and there is an active shooter,
3 the FBI recommends you run, hide, or fight, in that order.
4 Running improves your chances of survival. Leave your belongings
5 behind and don't stop until you've reached a safe location. Keep
6 your empty hands raised and clearly visible when exiting the
7 building.

8 Follow all instructions from the police. If there is no safe
9 escape route, hide. Silence your cell phone. Do not call 911
10 until it is safe. Fight only as a last resort.

11 If there's a need to shelter in place due to an emergency, we
12 will remain in this auditorium. We are below ground and in a
13 secure location. If such a situation arises, we will make an
14 announcement. Staff and security will guide anybody in the lobby
15 into this room. We will then secure the doors until the danger
16 passes. Next slide.

17 Lastly, I'd like to remind everyone that each of us has a
18 vital role to play in any emergency. If you see something
19 concerning or suspicious, say something to one of our NTSB staff
20 or security staff right away. If you have any questions or
21 concerns, don't hesitate to talk to any member of the NTSB staff.

22 Chair Homendy, that concludes my remarks.

23 CHAIR HOMENDY: Thank you, Mr. Brazy, if anyone here is here
24 or watching remotely and you are not familiar with who the
25 National Transportation Safety Board is, the NTSB is an

1 independent federal agency that's charged by Congress with
2 investigating every civil aviation accident in the United States
3 and significant events in all modes of transportation.

4 We issue an official determination regarding probable cause
5 as appropriate. We will issue safety recommendations to prevent
6 future accidents. We also investigate certain incidents that
7 present significant safety issues, and we strive to accurately
8 identify and report all relevant facts, conditions, and
9 circumstances relating to each accident or incident we
10 investigate.

11 When necessary, we hold investigative hearings. An
12 investigative hearing allows the NTSB to gather sworn testimony
13 from witnesses on issues identified by the investigative team for
14 a specific event or systemic safety issue. This hearing is an
15 important part of our ongoing investigation of the accident that
16 occurred on January 5th, 2024, in Portland, Oregon.

17 Investigative hearings are fact finding proceedings. The
18 purpose is to receive testimony and evidence which may be of aid
19 in determining the cause of an accident. At about 5:14 p.m.
20 Pacific Time, a Boeing 737-Max 9 operating as Alaska Airlines
21 Flight 1282 returned to Portland International Airport after the
22 left mid exit door plug departed the airplane in flight, leading
23 to a rapid decompression.

24 The airplane landed on runway 28 left at Portland
25 International Airport without further incident, and all occupants

1 who flight crew members, four cabin crew members, and 171
2 passengers deplaned at the gate.

3 Seven passengers and one flight attendant received minor
4 physical injuries. I say physical injuries because this was quite
5 traumatic for the crew and the passengers, and injuries we can't
6 see, which we often don't talk about, can have profound lasting
7 impacts on lives and livelihoods.

8 So on behalf of the entire agency, we are so sorry for all
9 that you experienced during this very traumatic event. For those
10 in the room, Elias Kontanis from our Transportation Disaster
11 Assistance Division is here to provide support to anyone who may
12 need it, and I believe he's at the back of the -- oh, Elias is
13 right there. Can you raise your hand? Hand up. Great. Thank
14 you.

15 This hearing will consist of four panels, overview of Boeing
16 737-Max 9 manufacturing and inspections. Events surrounding the
17 opening and closing of the mid exit door plug. Safety management
18 systems and quality management systems. And Federal Aviation
19 Administration oversight. These topics were identified at a
20 prehearing conference with a technical panel, parties to the
21 hearing, and the Board of Inquiry, which we hosted last week on
22 August 1st, 2024.

23 As a reminder, if anyone has information they would like to
24 share with the board, whether you're here or not here, or the
25 investigative team, please do not hesitate to reach out to us at

1 witness@ntsb.gov. Again, witness@ntsb.gov, at any time. You may
2 also email me at chair@ntsb.gov, and I will share that information
3 with the investigative team for follow up.

4 I'd now like to introduce the NTSB staff we have in the front
5 row. They consist of the technical panel. Mr. Doug Brazy is our
6 hearing officer. Mr. John Lovell, our investigator in charge for
7 this investigation. Mr. Pocholo Cruz, lead aerospace engineer.
8 Mr. Nils Johnson, aviation accident investigator, maintenance.
9 And Dr. Sabrina Woods, senior human performance investigator.

10 In the back row, we have Ms. Leani Benitez-Cardona, who will
11 operate the audio visuals. We have Ms. Sierra Juliano, who will
12 operate the timer. And we have Mr. Tim LeBaron, director of the
13 Office of Aviation Safety. Behind me is Mr. Eric Johnson, who
14 will provide legal support.

15 Now let's turn to the parties to the hearing. Thank you all
16 for your cooperation with our investigation to date. Federal
17 regulations guide how we designate parties to an NTSB
18 investigation and to an NTSB investigative hearing. They are
19 those persons, governmental agencies and organizations, whose
20 special knowledge will contribute to the development of pertinent
21 evidence.

22 The parties to this hearing have been designated in
23 accordance with these regulations and selected for their technical
24 expertise in their respective fields. As I call the name of each
25 party, I ask the designated spokesperson to identify themselves

1 and then introduce others at their table. We're going to go today
2 in alphabetical order by organization, so we'll start with Airline
3 Pilots Association.

4 CAPT JANGELIS: Good morning, Madam Chair. My name is
5 Captain Steve Jangelis. I'm the aviation safety chair for the
6 Airline Pilots Association. With me today is our party
7 coordinator, Captain Mark Henegar from Alaska Airlines, Captain
8 Craig Boxrucker is here, also from Alaska Airlines, as well, as
9 Captain Dennis Vorpall. Along with me is ALPA staff, Chris Heck
10 and Captain Jeff Perrin, our accident investigation board chair is
11 also with us today. Thanks.

12 CHAIR HOMENDY: Thank you, Captain. Alaska Airlines.

13 MR. TIDWELL: Good morning. My name is Max Tidwell, vice
14 president of safety with Alaska Airlines. I have with me today
15 Mr. Ben Allen, Peter Goetz, John Sites who is our director of
16 Flight safety and Jason Lai, who is our maintenance and
17 engineering. Thank you.

18 CHAIR HOMENDY: Thank you, Mr. Tidwell. Association of
19 Flight Attendants.

20 MR. HEIPLE: Good morning. I'm Seth Heiple. I serve as the
21 AFA, Association of Flight attendants, air safety, health and
22 security chair at Alaska Airlines, and as the AFA party
23 coordinator for the accident. With me are Chris Witkowski,
24 director of the Air Safety, Health and Security department at AFA.
25 Dinkar Mokadam, AFA's OSHA specialist. Ronda Ruderman, chair of

1 AFA's Aircraft, Technical and SAE committees. And Steve Vincent,
2 AFA investigator for the accident.

3 CHAIR HOMENDY: Thank you, Mr. Heiple. And we will go with
4 Federal Aviation Administration.

5 MR. GERLACH: Good morning, Chair. David Gerlach as the
6 spokesperson for the agency. I have to my right, Matt Rigsby, who
7 is the FAA IIC. And then Ms. Hillary Hines from Aircraft Cert.
8 Brian Kilgroe, Brian Knaup, our witnesses today. And Chris
9 Stephenson, general counsel's office.

10 CHAIR HOMENDY: Thank you, Mr. Gerlach. And International
11 Association of Machinists and Aerospace Workers.

12 MR. HOLDEN: Good morning, Chair. My name is Jon Holden.
13 I'm president of Machinist District 751. With me, I have AMTI,
14 John Petruzzello. We have our General counsel, Jonathan Shapiro.
15 Business Rep, Lloyd Catlin. And our witness. And we also have
16 business rep grievance coordinator, Daniel Swank.

17 CHAIR HOMENDY: Thank you very much. And Spirit AeroSystems.

18 MS. MEYER: We have Heather Meyer, myself, which is a vice
19 president of quality at Spirit AeroSystems. We have Mark
20 Dombroff, counsel. And then we have witnesses Bill Brown, Greg
21 Brown, and Mike Riney, sitting at the table.

22 CHAIR HOMENDY: Thank you very much. And thank you to all
23 the parties. As a reminder, only party spokesperson may question
24 the witnesses on behalf of their organization. As we announced on
25 June 27th, Boeing remains a party to the investigation, but not to

1 this hearing. As such, the company is not permitted to question
2 the witnesses during these proceedings.

3 However, I am very pleased that Boeing has joined us today.
4 Thank you for your continued work with us on this investigation.
5 We have a shared goal, collective duty to ensure -- or to ensure
6 improvements to safety. Your assistance in developing the most
7 complete and factual record for this investigation is critical.
8 And again, thank you for being here.

9 And that goes for all the parties. On behalf of the NTSB,
10 I'd like to thank you for your assistance with our investigation
11 thus far. Parties are essential in helping us develop the facts
12 around an investigation. With that said, as a reminder, all of
13 your organizations have signed a party agreement that lays out the
14 rules of conduct which remain in effect throughout the course of
15 this investigation.

16 This includes, but is not limited to, the provisions of 49
17 Code of Federal Regulations, sections 831.11 and 831.13, which
18 respectively specify certain criteria for participation in NTSB
19 investigations, and limitations on the dissemination of
20 investigation information.

21 I'm now going to ask each party spokesperson and when the
22 Boeing witnesses come up, them, to indicate whether you understand
23 and remain committed to upholding the NTSB party agreement in its
24 entirety. Please answer yes or no when I call your name by
25 organization. ALPA.

1 CAPT JANGELIS: Yes.

2 CHAIR HOMENDY: Alaska.

3 MR. TIDWELL: Yes.

4 CHAIR HOMENDY: AFA.

5 MR. HEIPLE: Yes.

6 CHAIR HOMENDY: Fairly and accurately.

7 MR. GERLACH: Yes.

8 CHAIR HOMENDY: IAM.

9 MR. HOLDEN: Yes.

10 CHAIR HOMENDY: Spirit.

11 MS. MEYER: Yes.

12 CHAIR HOMENDY: Thank you very much. On behalf of the board,
13 I'd like to thank the many witnesses testifying at this hearing in
14 support of aviation safety. Witnesses will be questioned under
15 oath. They will remain under oath until the conclusion of the
16 hearing.

17 We ask that all witnesses, and this is important, all
18 witnesses be present for the entire hearing, both days, unless you
19 have coordinated in advance with the hearing officer, because you
20 may be recalled later for further questioning.

21 The witnesses have been selected because of their ability to
22 provide the best available information on the issues pertinent to
23 this investigation. The witness list was reviewed by the parties
24 to the hearing last week at the prehearing conference. In the
25 interest of time, we will not describe the witnesses' credentials.

1 Instead we have prequalified each witness by documenting their
2 qualifications in writing. You may review each witnesses
3 biographical information in the public docket which opened to the
4 public this morning.

5 I'd now like to provide a general overview of the hearing and
6 appropriate conduct for the proceedings. You may wish to refer to
7 the hearing agenda for more detail. We expect each day to run
8 from 9:00 a.m. to 7:00 p.m. With that said, we can and will go
9 longer if needed. I will remind everyone that before I came to
10 the NTSB, I worked on the Hill where we had 17 to 20 hour markups.

11 We will not leave until all questions are asked. We will
12 break for a one hour lunch at about 1:45 p.m. each day and we will
13 have breaks throughout. The first break will occur after the
14 technical panel asks questions, before the parties begin to ask
15 their questions. However, if you need a break, pass me a note.
16 I'm not that formal. Throw a sticky up here.

17 So today's Panel One will run from about 10:00 a.m. to lunch.
18 The topic is overview of Boeing 737-Max 9 manufacturing and
19 inspections. Following lunch, Panel Two will run till about,
20 well, whenever. We'll cover the events surrounding the opening
21 and closing of the mid exit door plug.

22 Tomorrow we'll begin with Panel Three, safety management
23 systems and quality management systems, which will take us to the
24 lunch break. And following lunch, we'll have Panel Four on FAA
25 oversight. We'll follow the same process for all panels.

1 Mr. Brazy will reintroduce the members of the technical panel and
2 swear in the witnesses. And then witnesses will be questioned
3 first by the technical panel, second by the parties, third by the
4 Board of Inquiry.

5 Parties will have designated time during each panel to
6 question the witnesses. Each party will keep their questions to
7 five minutes or less. We have a timer to help you stay on track.
8 We do anticipate, anticipate being able to accommodate more than
9 one round of questions per panel. I will make all rulings on the
10 admissibility of exhibits, appropriateness of questions, and
11 pertinence of proffered testimony.

12 If a party spokesperson objects to any question asked during
13 the hearing, or wishes to discuss admissibility of an exhibit, or
14 the pertinence of proffered testimony, please raise your hand and
15 wait to be recognized by me.

16 A word about conduct. This is not an adversarial hearing.
17 This doesn't mean tough questions won't be asked. They should be
18 asked. This is an investigation. However, the board does not
19 permit cross examination of witnesses in the legal sense, nor do
20 we assign fault or blame for an accident or incident.

21 As a result, we will not permit questions related to fault,
22 outside litigation, or legal liability in general. Questions
23 related to legal liability or fault are not relevant to the fact
24 finding purposes of an investigative hearing, or our statutory
25 mission. We're here to improve safety.

1 Before I invite the hearing officer to introduce the
2 exhibits, I'd like to acknowledge the many people on Team NTSB
3 who've made this hearing possible. The Office of the Chief
4 Financial Officer, Office of the Chief Information Officer, Office
5 of the General Counsel, Office of the Managing Director, Office of
6 Aviation Safety, Office of Research and Engineering, Office of
7 Safety Recommendations and Communications, and, of course, the
8 Offices of Members Graham, Chapman, Brown, and Inman, as well as
9 my team,

10 I'd also like to give a shout out to our summer interns,
11 Sierra Juliano, which again is in the back and Natasha Mahadio who
12 have assisted us in the preparation of this hearing. Our other
13 fabulous interns are Jacob Wells, Kadin Nuri, Jeremy Braden
14 Edwards, and Matthew Chin. Thank you all for your work throughout
15 the summer.

16 Next, the hearing officer will describe the exhibits.

17 Mr. Brazy.

18 MR. BRAZY: Thank you, Chair Homendy. Exhibits for this
19 hearing include reports produced by NTSB investigative staff,
20 videos, and other documents submitted by the technical panel
21 members, witnesses, and parties to support the testimony,
22 questions you will hear over the next two days.

23 The exhibits for the hearing are in the docket. The docket
24 number is SA, Sierra Alpha, 543. The NTSB is authorized by
25 statute to disclose information to carry out its mission, but we

1 protect confidentiality and proprietary information to the
2 greatest extent possible.

3 As such, the exhibits contain redactions. These are the
4 result of negotiations between parties and the NTSB regarding the
5 disclosure of information claimed to be personally identifiable,
6 security sensitive, or proprietary in nature. Though redacted,
7 the exhibits contain sufficient information so that members of the
8 public can refer to them during the hearing and throughout the
9 NTSB investigation.

10 The exhibits entered into the record and any presentations
11 along with other records of the investigation, become part of the
12 NTSB public docket and are available via the NTSB website
13 [ntsb.gov](https://www.nts.gov). The public docket opened this morning. Party
14 spokespersons and witnesses have been provided electronic copies
15 of the public docket containing the exhibits identified above.

16 The docket is located on the investigation page, which you
17 can access in one of two ways. You can visit [NTSB.gov](https://www.nts.gov), or if
18 you've joined us in person, you can scan the QR code on the back
19 of the adhering agenda.

20 On the investigation page, you will find the link to the
21 public docket on the right hand side just above the map. A
22 transcript of the testimony taken during the hearing will be
23 prepared and entered into the docket as soon as possible. In
24 addition, Mr. Johnson will keep a list of any documents that are
25 identified during the hearing, which are not currently exhibits in

1 the NTSB public docket.

2 As a reminder, if a party to the hearing has a new exhibit to
3 propose, in accordance with 49 C.F.R. 845.9, it will not be
4 admitted unless the Chair determines that good cause has been
5 shown. The documents will be submitted after the hearing and
6 entered into the public docket.

7 While the parties do not participate in the analysis of our
8 evidence, you can submit written comments for our consideration.
9 This is where parties can state their views for the record, such
10 as the potential conclusions that may be drawn. We strongly
11 encourage parties to submit written comments, which are beneficial
12 to our analysis.

13 Our regulations provide two separate opportunities to do
14 this. First, you may submit comments on the hearing per 49 C.F.R.
15 845.13. Following an investigative hearing, any party to the
16 hearing may submit proposed findings to be drawn from the
17 testimony and exhibits, and proposed probable cause, and proposed
18 safety recommendations designed to prevent future accidents or
19 incidents.

20 The proposals shall be submitted within the time specified by
21 the investigative hearing officer. At the close of the hearing,
22 it shall be made part of the public docket. Parties to the
23 investigative hearing shall serve copies of their proposals to all
24 other parties to the hearing.

25 Such comments are due to me, the hearing officer, within 30

1 days after the close of the hearing, and that's Friday, September
2 6, 2024. We ask that any submissions be sent to us
3 electronically.

4 The second opportunity to submit comments is through the
5 traditional party submission process outlined in 49 C.F.R. 831.14.
6 Any party to the investigation designated under 831.11 may submit
7 to the NTSB written, proposed findings to be drawn from the
8 evidence produced during the course of the investigation, a
9 proposed probable cause, and/or proposed safety recommendations
10 designed to prevent future accidents. A due date for this
11 submission will be provided at a later time.

12 You may avail yourselves of one, both, or neither of these
13 opportunities. If you do send comments at any point, they will be
14 included in the public docket. As mentioned, we will consider
15 party comments during the analysis phase of the investigation and
16 our preparation of the final report.

17 Chair Homendy, that concludes my remarks. Thank you.

18 CHAIR HOMENDY: Thank you, Mr. Brazy. I'll now ask
19 investigator in charge, John Lovell, to provide an overview of the
20 accident. The floor is yours.

21 MR. LOVELL: Good morning. As you heard in the Chair's
22 opening remarks, on January 5th, 2024, about 1714 Pacific Standard
23 Time, Alaska Airlines Flight 1282, a Boeing 737-9 Max, returned to
24 Portland International Airport, Portland, Oregon, after the left
25 mid exit door, MED plug, departed the airplane, leading to a rapid

1 decompression.

2 Shortly after takeoff, the captain said that while climbing
3 through about 16,000 feet, there was a loud bang. Both flight
4 crew said they immediately donned their oxygen mask. They added
5 that the flight deck door had blown open due to the rapid
6 decompression in the cabin.

7 It was very noisy and difficult to communicate among
8 themselves, and with the cabin crew. The flight crew immediately
9 contacted air traffic control, executed emergency procedures,
10 landed on runway 28 left, and taxied to the gate without further
11 incident.

12 After the rapid decompression, meanwhile, in the cabin, the
13 oxygen -- the emergency oxygen masks deployed and the cabin crew
14 performed their safety functions to assist passengers, to include
15 secured the cockpit door that had blown open, donned oxygen masks
16 so that they could then assist passengers, attempted to
17 communicate to the flight crew, but it was so loud that they could
18 not hear a response, assess the condition of the cabin, issued
19 instructions and did appropriate individual checks on passengers,
20 such as an unaccompanied minor.

21 And they prepared the cabin for the emergency landing. The
22 left MED plug was recovered from a neighborhood backyard. The
23 plug and the associated hardware are shown on this slide. The
24 accident airplane was equipped with an MED plug, which is a
25 customer option. The MED plug is not meant to be open during

1 operation. It is only operated during inspections.

2 The investigation found that the MED plug left the Boeing
3 Renton Manufacturing Plant and was delivered to Alaska Airlines
4 without the four bolts having been installed that were required to
5 secure it to the fuselage. The left MED plug was installed and
6 pre-rigged on the fuselage on July 18th, 2023. at Spirit
7 AeroSystems.

8 You will hear more about this process in the first panel that
9 talks about manufacturing. The close and verified pre-rig task
10 was accomplished on July 28th, 2023, per production order. The
11 fuselage was shipped by train to the Boeing Renton facility on
12 August 31st, 2023.

13 Evidence showed that the required four retaining bolts were
14 installed. At that time, it was inspected and no nonconformance
15 reports, or NCR's, were issued against the MED plug. If a
16 discrepancy is noted with the plug, an NCR is generated, and the
17 repair or rework is performed.

18 Boeing does not open the MED plug unless a discrepancy is
19 found. The Boeing production process typically has nine factory
20 flow day positions in the 737-9 final assembly process, six of
21 which can affect the MED plug.

22 Records show that on September 1st, 2023, an NCR was created
23 noting five damaged rivets on the edge frame forward of the left
24 MED plug. On this slide, the yellow circles show the location of
25 the damaged rivets. To rework the damaged rivets, access required

1 opening the left MED plug as shown on the slide now.

2 The rivets were replaced per non conformance order and was
3 completed on September 19th, 2023, by contract Spirit AeroSystems
4 personnel at the Boeing Renton facility. The MED plug was then
5 closed, and the airplane was delivered to Alaska Airlines.

6 As stated earlier, post-accident evidence showed that the
7 retaining bolts were not installed. The blue circles show the
8 location where the bolts should have been installed. Insulation
9 is covering the fourth location. More details about the opening
10 and closing of the left MED plug will be discussed in panel number
11 two.

12 This slide shows that between September 18th, 2023, at 5:16
13 a.m., and September 19th, 2023, at 10:56 p.m., the MED plug was
14 opened, the rivet rework was performed, and the MED plug was
15 closed. This information is the culmination of NTSB's review of
16 Boeing's Shippside action tracker, or SAT, of text messages,
17 photographs, interviews, installation plans, nonconformance
18 records, and nonconformance orders.

19 Panel Three will discuss the quality management system and
20 voluntary safety management system. And Panel Four will touch on
21 FAA oversight, so that by the end of this investigative hearing,
22 there should be a better understanding of how the four retaining
23 bolts escaped established processes.

24 NTSB staff was notified of the accident on the night it
25 occurred. And the NTSB go team launched the following day to

1 Portland, Oregon to investigate. The listed people on this slide
2 assisted in the conduct of and are supporting this ongoing
3 investigation.

4 The chair of the NTSB traveled with the investigative team
5 and acted as the agency spokesperson. Next slide. The NTSB
6 invited qualified persons to act as parties to participate in the
7 investigation. These entities included, these entities included
8 Airline Pilots Association, Alaska Airlines, the Association of
9 Flight Attendants, Boeing commercial airplanes, the Federal
10 Aviation Administration, the International Association of
11 Machinists Union, and Spirit AeroSystems.

12 As the chair mentioned, Boeing is a party to the
13 investigation but is not a party to this investigative hearing.
14 Madam Chair, this concludes my opening statement. And I now turn
15 it over to you as Chair of the Board of Inquiry.

16 CHAIR HOMENDY: Thank you very much, Mr. Lovell. We'll now
17 begin with the first panel. Will the hearing officer please
18 introduce, once again, the members of the technical panel bring up
19 the witnesses and then swear in the witnesses?

20 MR. BRAZY: Yes, ma'am. Thank you. Will our witnesses
21 please take their seats at the table across from the room, please.
22 Chair Homendy, the first panel is overview of the Boeing 737-Max 9
23 manufacturing and inspection. The panel will address Boeing 737-
24 Max 9 production in general, the training of mechanics, turnover
25 and retention, mechanic experience, pairing, and assigning of

1 tasks, the process of documenting nonconformance, description of
2 the Shipline Action tracker system, and its intended use.

3 Description of the common manufacturing execution system and
4 its intended use, and the process for documenting the removal of
5 previously installed parts or components. The NTSB panel starting
6 to my right, is composed, composed of Mr. John Lovell, the
7 investigator in charge. Mr. Pocholo Cruz, lead aerospace
8 engineer. Mr. Nils Johnson, aviation accident investigator for
9 maintenance. Dr. Sabrina Woods, senior human performance
10 investigator.

11 Witnesses for Panel One are composed of the following
12 individuals: From my left, nearest the board members,
13 Ms. Elizabeth Lund, chair of Quality Operations counsel and senior
14 vice president for quality at Boeing Commercial Airplanes.
15 Mr. Doug Ackerman, vice president of supplier quality, Boeing
16 Commercial Airplanes. Mr. Terry George, senior vice president and
17 general manager for Boeing programs at Spirit AeroSystems.
18 Mr. Scott Grabon, senior director, 737 and P8 quality at Spirit
19 AeroSystems. And Mr. Lloyd Catlin, business representative at the
20 International Association of Machinists and Aerospace Workers.

21 I now ask that the witnesses please stand to be sworn in.
22 Please raise your right hand and please answer by saying I do.
23 (Whereupon,

24 TERRY GEORGE, SCOTT GRABON, ELIZABETH LUND,
25 DOUG ACKERMAN, and LLOYD CATLIN

1 having first been duly sworn, were examined and testified under
2 oath, as follows:)

3 Thank you. Please be seated. As a reminder to the
4 witnesses, you will remain under oath until the conclusion of the
5 hearing. We ask that you answer questions factually and avoid
6 analysis. Finally, please push the microphone button to talk and
7 then push it again when finished.

8 Chair Homendy, these witnesses have been prequalified and
9 their respective experience and qualifications appear in the
10 docket as exhibits. I would now like to turn the questioning over
11 to Mr. Cruz.

12 CHAIR HOMENDY: Before you begin, Mr. Cruz, two things. One,
13 because I asked the parties and now that Boeing is up here, I'm
14 going to ask Ms. Lund on behalf of Boeing, to indicate whether
15 Boeing understands and remains committed to upholding the NTSB
16 party agreement in it in its entirety. Please answer yes or no.

17 MS. LUND: Yes.

18 CHAIR HOMENDY: Thank you. And for -- a word of caution for
19 everybody here, Board of Inquiry, technical panel, parties,
20 witnesses, there are a number of names of personnel. Some are not
21 redacted, some are redacted in the, in the docket. Do not use --
22 you can use positions. You can use what work crew, not names of
23 those personnel who have been redacted. Thank you so much.

24 Mr. Brazy.

25 MR. BRAZY: Mr. Cruz.

1 INTERVIEW OF TERRY GEORGE, SCOTT GRABON, ELIZABETH LUND,
2 DOUG ACKERMAN, LLOYD CATLIN

3 MR. CRUZ: Good morning.

4 Mr. George, what are your roles and responsibilities as the
5 Spirit AeroSystems Senior Vice President, general manager of
6 Boeing program?

7 CHAIR HOMENDY: Can I ask the staff to pull the microphones
8 closer?

9 MR. CRUZ: Sorry.

10 CHAIR HOMENDY: And can you repeat that question one more
11 time, Mr. Cruz?

12 MR. CRUZ: Sure.

13 Mr. George, what are your roles and responsibilities as the
14 Spirit AeroSystems senior vice president, general manager of
15 Boeing systems?

16 MR. GEORGE: I'm the leader for Wichita and Tulsa, mainly the
17 Boeing programs for all of the operations, which includes
18 fabrication, assembly, the support groups. And also tooling and
19 facilities.

20 MR. CRUZ: Thank you.

21 Similarly, Mr. Grabon, what are your roles and
22 responsibilities as the Spirit AeroSystems senior director, 737 P8
23 quality?

24 MR. GRABON: Good morning. I'm responsible for the oversight
25 of the quality organization covering the 737 as well as the P8 to

1 ensure that we are performing, performing and -- performing to
2 meet the compliance required.

3 MR. CRUZ: Thank you.

4 Mr. George, does Spirit AeroSystems hold the production
5 certificate?

6 MR. GEORGE: We do not.

7 MR. CRUZ: Okay. Would you --

8 CHAIR HOMENDY: Can I ask the witnesses to also speak up and
9 pull the microphone? Thank you.

10 MR. CRUZ: Would you generally describe what component Spirit
11 AeroSystems manufacturers for the Boeing company and describe the
12 Spirit AeroSystems fuselage manufacturing process in the Wichita
13 plant?

14 MR. GEORGE: In the Wichita plant we have all of the Boeing
15 forward sections. We also have the 737, the entire fuselage. All
16 of -- most of the Boeing propulsion end items, so the engine
17 nacelles. In Tulsa, we have mainly the wing components for the
18 Boeing aircraft.

19 MR. CRUZ: What is the company's organization or reporting
20 structure like, starting from Spirit production personnel?

21 MR. GEORGE: Well, like I said earlier, I'm the, I'm the
22 senior vice president, so I have nine or ten either vice
23 presidents or directors that report to me, most of them in
24 Wichita, but also one in Tulsa. And again, it's divided into, for
25 example, the 737 fuselage has a leader. The propulsion package

1 has a leader. The 737 and thrust reverser has a leader. My
2 fabrication area has one. The tooling and facilities group has a
3 separate leader. The same in Tulsa. That's generally how we're
4 organize.

5 MS. MEYER: Madam Chair, I believe we have a video that might
6 -- and Mr. Cruz a video that might explain the production better
7 if we could call that up, I would request.

8 Mr. Grabon.

9 MR. GRABON: Good morning. So let's pause here, please, on
10 this slide. This video is a time lapse video of the build of the
11 737 fuselage at Spirit AeroSystems. So I'm going to ask that you
12 pause on the first two slides. There's some technical data that
13 may help everybody in the room understand what you're going to see
14 through the, through the time lapse video. It takes approximately
15 three minutes for the entire video. Okay.

16 Please proceed to the first slide. Okay, let's pause. So
17 this is the Spirit responsibility. All areas in blue, like Terry
18 just mentioned, are what Spirit is responsible for. This video is
19 going to concentrate on the fuselage section, which is the tubular
20 section running diagonally on the screen. The fuselage is made-up
21 of six independent sections that will all become one piece, one
22 part number at the very end. It will also comprise approximately
23 70 percent of the total structure of the 737.

24 Okay, next slide. Okay. Let's pause here for just a second.
25 So this is the Spirit work statement. This is specific to a

1 single fuselage. There is approximately 18,000 parts per
2 fuselage, 200,000 fasteners per fuselage. At the current rates,
3 that equates to approximately 6.2 million fasteners per month and
4 74 million fasteners per year.

5 There's also 288 suppliers, that's both domestic and
6 international. It's important to note that based on the size and
7 scope of this, of this build, Spirit is an AS9100 certified
8 facility, meaning that our quality management system conforms to
9 the international standards for aerospace manufacturing. We do
10 that through the use of approximately 250 quality inspectors who
11 perform both in process as well as final inspections.

12 And it's also important to note that both Boeing and the FAA
13 historically and currently have had an on site presence at Spirit
14 to help oversee quality as well as regulatory oversight. Okay.
15 So let's proceed with the video and this is -- it's going to -- it
16 will move pretty quickly.

17 So the video takes place entirely in Wichita, Kansas. This
18 is our global design -- global logistics center, where detailed
19 parts are received from all around the world, as well as Spirit
20 fabrication. Spirit also receives raw material. This raw
21 material, such as this aluminum, large aluminum plates will be
22 made into skins on the 737.

23 Spirit processes at our own facility. Following processing,
24 those detailed parts will be brought to the floor. They'll be
25 made into assemblies, and they'll feed the sections that were

1 described on the first slide.

2 These are our floor beams. Floor beams are made for each
3 section of the fuselage. Each section -- the floor beams will be
4 integrated into each section before the sections are moved into
5 being integrated into a final fuselage. Spirit also uses
6 technology such as what we call SPIFI, which is both a touch and a
7 scanning technology used to measure fastener head heights.

8 So this is also our auto fastening machinery, similar to
9 Spiffy where 50 percent of the through skin fasteners are done
10 through our auto fastening process. Following auto fastening, the
11 majority of drilling and filling is done by hand.

12 Upon completion of each section, the sections will be lifted
13 up by crane that you see here, brought over to our integration
14 area, where they'll be lowered onto positioning pogos. The
15 positioning pogos then laser align, first the lower sections, and
16 then the forward and aft sections are brought together.

17 Spirit also uses industrial engineering type technology that
18 ensures that the proper person is at the proper place at the
19 proper time throughout the build in the fuselage. Once the laps
20 and joins are completed, you now have all sections have become a
21 single fuselage. Once complete, the fuselage will be lifted out
22 of integration and brought over to our seal bay area by crane.

23 In seal bay, the interior and exterior of seal will be
24 applied. From there it will go to our camo facility. In camo, it
25 will be primed, painted, and corrosion inhibitor applied.

1 Spirit also has a facility in Subang, Malaysia. In Subang,
2 we do detailed parts as well as assemblies. This is where the mid
3 exit door plug is built, packaged, and shipped to the Wichita
4 facility. Once received in Wichita, the door will be installed
5 and pre rigged, as noted earlier in the statements.

6 Once all the structure is complete on a 737 fuselage, the
7 unit is placed on a rail car and prepped to ship. At this point,
8 Boeing -- Spirit delivers the air -- the fuselage to Boeing.
9 Boeing then pulls the fuselage approximately 2,000 miles over a
10 course of about 12, on average 12 days to its Renton facility.
11 The 737 plant in Renton, Washington, at which point the empty
12 fuselage will be stuffed with electrical, hydraulics, interiors,
13 and be integrated into a 737 aircraft.

14 MR. CRUZ: Thank you for that presentation.

15 How many manufacturing lines are there for the 737 fuselage
16 in Wichita?

17 MR. GEORGE: I'm sorry, can you repeat that?

18 MR. CRUZ: Yes. How many manufacturing lines are there for
19 the 737 fuselages in Wichita?

20 MR. GEORGE: Currently we have ten integration tools. That's
21 the best way I can answer that question and what Scott just showed
22 you, when we were loading each of the sections into integration
23 tools with the help of the AIT manipulators. There's ten of
24 those.

25 MR. CRUZ: And how long does it take to manufacture a 737

1 fuselage in Wichita?

2 MR. GEORGE: Again, difficult question. If we think about
3 starting with the purchase of raw material, it's 12 months. So we
4 purchase raw material, we fabricate parts, we do subassemblies, we
5 also assemble the sections and then into integration. So
6 generally it's about a 12 month time period.

7 MR. CRUZ: What Spirit documents are used to manufacture the
8 fuselage?

9 MR. GRABON: In order to manufacture a fuselage, Spirit
10 utilizes what we call IP's, which are instructions. Each section
11 is built up via all the all the instructions, make the detailed
12 parts and the assemblies. I'm not sure, does that answer your
13 question?

14 MR. CRUZ: Yeah. Is there like a hierarchy of documents that
15 you have, as far as the production orders or anything like that?

16 MR. GRABON: Well, we follow our IP's, our production orders,
17 as well as our procedures and policies. We do have -- and we also
18 have BAC's which are, which are Boeing documents that have very
19 specific requirements that we must meet.

20 MR. CRUZ: Does Spirit owned the documents. Or does Boeing?

21 MR. GRABON: Spirit owns our work orders. Boeing owns
22 certain specifications.

23 MR. CRUZ: Okay. And how often are the manufacturing
24 documents audited for clarity and ease of use?

25 MR. GRABON: Spirit's under a continual audit process. We

1 audit based on either certain findings throughout other audits, or
2 annually in certain areas. It really does depend on if there's
3 been any findings, and how often. If we audit, let's say,
4 annually, if we've had findings in certain areas, we'll perform
5 additional audits.

6 MR. CRUZ: Would you please describe the Spirit process
7 should there be a discrepancy during the manufacture of a
8 fuselage? How is this discrepancy tracked and managed?

9 MR. GRABON: If a discrepancy is found, we really have two
10 means to document. One we -- is a is called a pickup. What we
11 refer to as a pickup. A pickup is a non, a non conformance that
12 does not require an engineering disposition to be brought back to
13 engineering requirements.

14 The second means that Spirit utilizes is a non -- an NC, a
15 nonconformance. What that is we'll refer to as a tag. The defect
16 will be, will be detailed on the tag location, type of defect,
17 part numbers, reference to drawing numbers. Engineering will
18 provide a disposition of how to how to correct the defect. It
19 will not be brought back to engineering, original engineering, but
20 will be brought back to another acceptable means for engineering.
21 Engineering has the final say.

22 Once the engineering disposition is created, the operations
23 team will perform the rework. Quality team will reinspect and
24 accept.

25 MR. CRUZ: So in discussions with Spirit personnel, the

1 investigative team heard the term defect and nonconformity in
2 manufacturing. Can you describe the difference?

3 MR. GRABON: Nonconformance is a -- it's an item that does
4 not meet the engineering requirements. The term defect, it's
5 difficult with the word defect. Everything is a nonconformance in
6 the quality. A defect can be a nonconformance. But just because
7 there is a defect, it doesn't necessarily mean there's a
8 nonconformance.

9 And I think that's a, that's an important note we can -- you
10 can see something that is ugly, but it doesn't mean it's a
11 nonconformance.

12 MR. CRUZ: So Spirit production documents show that their
13 inspection points in the manufacturing records. How and who
14 determines these inspection points?

15 MR. GRABON: Inspection points are determined by quality,
16 manufacturing, or engineering, typically. Depending on where --
17 how the build is made. You can have an, you can have an
18 inspection point added by having additional findings later on
19 throughout the build as we mature. Just to add an inspection
20 point, to add an extra layer of oversight.

21 MR. CRUZ: Is there a difference between Spirit manufacturing
22 personnel inspections and Spirit quality personnel inspections?
23 If so, what, what are the differences?

24 MR. GRABON: Spirit manufacturing doesn't perform
25 inspections, the quality team performs inspections. Manufacturing

1 can identify an area to be inspected, but only a qualified Spirit
2 Inspector can actually perform the inspection.

3 MR. CRUZ: Is there any certification requirements to be the
4 quality inspector?

5 MR. GRABON: Quality inspectors are a specific job code. It
6 is, it is -- which is different than a manufacturing person.
7 Spirit quality, quality inspectors also go through training in
8 order to become inspectors.

9 MR. CRUZ: So should Spirit systems decide there needs to be
10 a change in the manufacturing, the manufacturing process, are any
11 changes coordinated with Boeing? And how does Spirit communicate
12 this to the FAA?

13 MR. GEORGE: I would say we have updates to our manufacturing
14 plan continuously as part of continuous improvement. Generally
15 not coordinated with Boeing, but there are times where there is a
16 need for coordination with Boeing. It is not coordinated through
17 -- to the FAA from Spirit.

18 MR. CRUZ: With those changes, how are the implemented
19 changes communicated to the manufacturing personnel?

20 MR. GEORGE: We have job paper or installation plans. That's
21 the -- that's what tells the manufacturing community how to
22 perform the work. If there's a change, we have a term of a red
23 flag. So on that installation plan it will flag it, if there's a
24 change to give the mechanic a heads up.

25 MR. CRUZ: So where are all your production records kept? Is

1 it in a system of some sort?

2 MR. GEORGE: Production records are kept and are MES system
3 manufacturing execution system.

4 MR. CRUZ: And what is your typical Spirit record retention
5 policy for these records?

6 MR. GEORGE: I'll have to come back to you with exactly how
7 long we hold on to the -- how long -- I mean, the records are for
8 the lifetime of the airplane. I just don't know how long we keep
9 them in in Wichita. We then put them in long term storage. I
10 just don't know what that timeframe is.

11 MR. CRUZ: Thank you.

12 Dr. Woods.

13 DR. WOODS: This question is for Mr. George. By all means,
14 pass it off if that's incorrect. At the time of the accident,
15 what was your average production rate for the year for 737
16 fuselage?

17 MR. GEORGE: At that time, it was 38 airplanes a month.

18 DR. WOODS: And currently, what is your production rate?

19 MR. GEORGE: Production rate is 31 airplanes a month.

20 DR. WOODS: What goes into dictating how your production rate
21 fluctuates?

22 MR. GEORGE: Generally, it's Boeing controls the master
23 schedule, if you will. They're going to determine a number of
24 deliveries, et cetera. Our rate is going to be based off of their
25 rate. There is some buffer inventory between us, so it doesn't

1 always have to be exact, but it's very similar.

2 DR. WOODS: When you change that rate, what sort of change
3 management process does Spirit employ to ensure that you maintain
4 the same level of conformity and safety with each change?

5 MR. GEORGE: We go through a rate readiness process and
6 basically what you're doing, you're looking at all resources. So
7 human resources, tooling, machines, space. From there, we're
8 doing our calculations of what additions need to be made to be
9 able to go from a lower rate to a higher rate. Obviously, hiring
10 personnel, adding the equipment, et cetera. Did that answer it?

11 DR. WOODS: It does. Thank you. Given the last five years
12 or so, has Spirit AeroSystems ever decided against a rate change
13 of any sort? For instance, trying to go from a lower rate to a
14 higher rate or conversely.

15 MR. GEORGE: You know, that's a, that's a good question. So
16 with COVID and the Max grounding, between ourselves and Boeing,
17 there were times where we had some very great conversations about
18 should we or should we not go to a particular rate increase. So
19 they have, the they have the authority. So we are obviously going
20 to fall, fall in line on whatever that rate increase is. But
21 because of the situation in the last five years, we have had some
22 good conversations relative to should we or should we not?

23 DR. WOODS: Thank you.

24 Mr. Johnson.

25 MR. JOHNSON: Good morning. Two things about my group of

1 questions. My group of questions are for Spirit, so I don't --
2 also, the perspective is that the September 2023 time frame, if
3 something's changed between September 23 and now, please describe
4 it.

5 CHAIR HOMENDY: Nils, we can't hear you.

6 MR. JOHNSON: I'm sorry. Did you guys catch that, or should
7 I repeat?

8 MR. GEORGE: I think we got most of it.

9 MR. JOHNSON: Okay. Do out of sequence production tasks ever
10 occur on the 737 production line.

11 MR. GEORGE: When we think about, excuse me, out of sequence,
12 out of sequence is relative to Spirit, as opposed to Spirit and
13 Boeing. So we'll just start right there. We do have out of
14 sequence activity. I would just for example, the last seven
15 months. Obviously we try to minimize it.

16 And there's a management decision associated with how much is
17 enough. I would tell you the last seven months, for example,
18 we've been at our lowest levels ever in terms of out of sequence
19 or travel work.

20 MR. JOHNSON: Okay. Do you have a formal process for dealing
21 without out of sequence production tasks?

22 MR. GEORGE: We do not. Meaning that -- and I've seen this,
23 again, I'm 41 years with Boeing and Spirit. So I've seen it done
24 a couple of different ways where you would actually create travel
25 IP's. But we do not do that, and we haven't done that since we

1 became Spirit 19 years ago.

2 MR. JOHNSON: In January of 2023, the investigative team
3 witnessed at Spirit and MED plug being installed on a fuselage.
4 The technician was observed using a lubricant not called out by
5 the engineering documentation to assist in closing the plug and to
6 protect the seals from damage. Did Spirit authorize the use of a
7 lubricant contrary to the requirements of the engineering
8 documentation?

9 MR. GEORGE: We, again, we have had some good conversations
10 with the Boeing company because both companies rigged, rigged
11 these doors. This particular MED door with the end gate and the
12 bulb seal and the friction associated with it, you have to have a
13 lubricant of some type, otherwise you're going to tear the, you're
14 going to tear the seal.

15 And the conversations through the years have been what's the,
16 what's the appropriate lubrication. So everything from Vaseline
17 to baby powder, to liquid soap, et cetera. And so to answer your
18 question, it was left up to the mechanic at that time to determine
19 what the appropriate lubrication should be. Since that time, we
20 have created engineering green line that now calls out the Dawn,
21 so as the preferred lubricant.

22 MR. JOHNSON: Okay, so the corrective action was formal
23 documentation in the engineering documentation to call out the
24 right lubricant.

25 MR. GEORGE: It was. It's through a green line. It exists

1 today. It actually officially went in, into effect, I think some
2 sometime in May.

3 MR. JOHNSON: What is the process Spirit AeroSystems uses to
4 remove a previously installed installation?

5 MR. GRABON: Spirit has a removal process. It's a
6 documentation. Anytime you have a completed installation, the
7 paperwork is closed. So Spirit performs a removal. A removal
8 documents anything that needs to be taken apart so that the formal
9 documentation exists to put it back together.

10 MS. MEYER: Madam Chair, Nils, I think you -- just one
11 correction. I think you said January 2023 and you meant 2024,
12 correct?

13 MR. JOHNSON: I meant September, what it was as of September
14 2023 at the time that 8789 was being fabricated.

15 MS. MEYER: Okay, fair enough. Thank you.

16 MR. JOHNSON: Has Spirit had any issues with undocumented
17 removals?

18 MR. GRABON: Spirit has, throughout our very complex build,
19 there has been times where we have had undocumented removals.
20 Those are corrected via corrective actions inside of our factory,
21 as well as disciplinary actions if needed.

22 MR. JOHNSON: Okay. I was going to ask what the corrective
23 actions were that you put in place to prevent it from reoccurring,
24 and you're saying changes to the process and formal corrective
25 action.

1 MR. GRABON: So we have to be careful if someone, if someone
2 let's say misses a removal process, the first thing we have to
3 learn is did they miss a removal process because they just didn't
4 understand the process. At which point they need to be retrained
5 and reeducated on how the removal process works. Otherwise, we
6 will look at disciplinary measures for avoiding a process.

7 MR. JOHNSON: If Spirit finds an issue or an escape related
8 to manufacturing, what is the process for corrective action on the
9 production line? And the second question is, how is Boeing
10 process -- or how is Boeing notified when this occurs?

11 MR. GRABON: So can you repeat the first part of that just to
12 make sure I'm clear on the answer?

13 MR. JOHNSON: Yep. If Spirit finds an issue or an escapement
14 related to the manufacturing, what is the process for corrective
15 action on the production line? I'll stop there.

16 MR. GRABON: Okay, so if there's a, if there's an escape from
17 Spirit AeroSystems and it's identified by Spirit, we have a notice
18 of escapement process. That process, the first thing we do is
19 look for scope and bound. What was the defect. What was the
20 escape, I should say. When did it occur. What aircraft are
21 affected. What line units are affected.

22 So we look for scope and bound first. But we'll also then
23 formally perform line checks throughout our factory. Meaning we
24 will look at everything that's in our production system and
25 perform an inspection to see if there is any of those defects

1 found in our production system.

2 At that point the NOE will be written with the, with the
3 scope and bound for anything that is not -- what is no longer in
4 Spirit's possession. And then the corrective action will be, we
5 do a root cause corrective action as to why the defect occurred.
6 Is it a manufacturing issue. Is it a, is it a planning. Is it a
7 -- an engineering issue. Whatever that is, and that will then be
8 corrected?

9 MR. JOHNSON: And what is the process used to notify Boeing
10 if this happens?

11 MR. GRABON: The NOE process. So once, once the defect is
12 determined to have escaped the Spirit factory and we give them a
13 notice of investigation now, which is a preliminary to the notice
14 of escapement. It's more, more of a heads up. If you have -- if
15 Boeing then has an aircraft, if let's say it's ready to deliver,
16 they'll know that there's potential for this defect to occur.

17 Then the official, true official notification is the notice
18 of escapement, which is the formal document that is then released
19 to Boeing indicating what units are affected, what exactly is
20 affected. And working on the root cause corrective action.

21 MR. JOHNSON: Okay. Thank you.

22 Mr. Cruz.

23 MR. CRUZ: Thank you.

24 Ms. Lund, what are your roles and responsibilities as the
25 Chair of Quality Operational Council and the Senior VP of Boeing

1 commercial aircraft -- Boeing commercial airplanes?

2 MS. LUND: Thank you. I have three primary roles. Number
3 one, as you mentioned, is the Chair of the Quality Operations
4 Council, which is a role in which I represent quality across the
5 Boeing company at the executive level, representing all business
6 units at our Executive Council.

7 I also, as you mentioned, am the leader of quality for Boeing
8 commercial airplanes. And in that role, I lead a team of
9 approximately 7,400 quality professionals across the BCA
10 organization.

11 And then lastly, I am responsible for the development and
12 execution of our comprehensive safety and quality plan, which we
13 have put in place post the Alaska accident.

14 MR. CRUZ: Thank you.

15 Similarly, Mr. Ackerman, what are your roles and
16 responsibilities as the Vice President and supplier quality Boeing
17 commercial airplanes?

18 MR. ACKERMAN: Good morning. I have two responsibilities
19 that, that cover the parts that we bring into our factories. Part
20 of it is for our external supply chain where I have a team that is
21 responsible for working with our external suppliers, oversee their
22 quality management system, and ensure we have conforming parts
23 coming in.

24 The other half is for our internal fabrication organization,
25 where we build parts internally that come into our factories. And

1 I have responsibility for the quality organization in fabrication.

2 MR. CRUZ: Thank you.

3 MS. LUND, does Boeing hold the production certificate?

4 MS. LUND: Yes, we do. We hold PC700, which allows us to
5 produce commercial aircraft.

6 MR. CRUZ: And what is the company's organization reporting
7 structure like? Starting from the production personnel and the
8 manufacturing process.

9 MS. LUND: The reporting structure is that for the personnel
10 in the manufacturing process, there are mechanics and inspectors.
11 The mechanics roll up through our manufacturing organization and
12 report to, in many cases, the programs, the 737 program, 677787,
13 or the fabrication division.

14 The inspectors are located on a program, work with the
15 program, but report directly to me as an independent organization
16 of quality.

17 MR. CRUZ: Can you please explain the Boeing production
18 process of building an airplane?

19 MS. LUND: I can, and I'd like to pull up two exhibits if I
20 could, if I could pull up --

21 MR. CRUZ: Sure.

22 MS. LUND: -- Boeing Exhibit 1.

23 MR. CRUZ: Yes.

24 MS. LUND: All right. To start with an overview to answer
25 the question, we have three production lines to build our 737 and

1 final assembly. There are ten flow days. Our first three flow
2 day one, two, and three, you will see those only listed once.
3 They are housed together. There are three positions in flow day
4 one, three positions in flow day two, three positions in flow day,
5 three, in a tool located there.

6 From that point you will see flow day four through ten. We
7 split into three lines. And for a point of clarity, I will
8 comment that at the time of September 2023, we were running only
9 two lines to build our 737's, the west line. In the central line,
10 we were using the East line to pull airplanes in to do rework, but
11 not in the baseline build of the aircraft.

12 If you could pull up Exhibit 2, please just a little bit more
13 detail of how we build the aircraft. On -- oh, that was it.
14 Thank you. If we can go back. Thank you so much. In flow day
15 one through three, this is the location where we load the fuselage
16 into that tool. You can see the tool I was referring to there in
17 flow date one through three.

18 This is where, again, in September of 2023, we would do an
19 initial inspection of the fuselage. That has since changed, but
20 we would do an initial inspection of that fuselage, and we start
21 to do things like install the blankets, ensure the airplane is
22 ready, and start to do the basic work on the fuselage.

23 When you move to flow day four, that is really our join
24 position. That is where we put the wings on the airplane. The
25 horizontal stabilizer, vertical stabilizer, and the gear. That's

1 where it really becomes an airplane, not a fuselage. Then we
2 continue through the process in flow day five. We start to load
3 the back of the airplane, interior components. We start to do
4 some rigging. We make sure our fuel tanks are good to go.

5 Flow day six, we turn power on the airplane. That is where
6 we turn it into a live airplane. We start to begin some of our
7 testing. We really start to build out the interior. Flow day
8 seven is really where we start to do our functional testing
9 throughout the airplane.

10 If I may, Mike, can I ask you to just move that chair out of
11 the way so I can -- that's great. Thank you. Thank you. Flow
12 day seven, we start to do our baseline cabin testing and our
13 flight control testing. That lasts for the next few flow days,
14 seven, eight, and nine. We start to test the airplane, makes sure
15 our systems are working. And we really finish out the interior
16 build as we get near the end.

17 By flow day nine, we hang our engines, we make sure
18 everything is ready to go. Two points I will comment on in this
19 flow that I think are relevant, when the, when the fuselage is in
20 the tool in flow day one through three, that's where we do our
21 initial verification of the rig for this mid exit door plug on the
22 airplanes that have the plug.

23 And then at the end of the line on flow day nine, we do our
24 final fit and fair rig of that plug as well. When the airplane
25 gets to flow day ten, we finish up the work and we get it ready to

1 move outside from the factory.

2 MR. CRUZ: Thank you. What was the production rate of the
3 737 fuselage or airplane prior to the accident?

4 MS. LUND: We were -- we had approved ourselves to build at a
5 baseline rate of 38 aircraft per month, but we were producing at a
6 rate lower than that, upper 20's to low 30's.

7 MR. CRUZ: And after the accident?

8 MS. LUND: We are still approved to produce at a maximum rate
9 of 38, but we dropped our rate considerably lower, to the single
10 digits, and we are now working our way back up to the 38 airplanes
11 per month, but we are still in the 20's at this point.

12 MR. CRUZ: Thank you. Dr. Woods.

13 DR. WOODS: Ms. Lund, you just gave us an overview of shortly
14 before the Alaska Airlines accident and then after. But in the
15 last five years, how has your production rate for the 737 line
16 fluctuated?

17 MS. LUND: Prior to COVID, and prior to the Lion Air and
18 Ethiopian Max accidents, we were producing at a rate on the 737
19 line of 52 airplanes per month. After the grounding of the
20 airplane, we slowed that down virtually to zero. And it has been
21 at a lower rate than that since. Coming out of COVID, when the
22 market came back, we were returned to service on the Max. We
23 started to increase that rate again steadily. And as was stated a
24 moment ago, we had been approved to reach 38 airplanes per month
25 but had not produced 38 airplanes in a given month prior to the

1 Max accident or to date.

2 DR. WOODS: Would you please describe for us what sort of
3 change management process does Boeing enact for -- to ensure the
4 same level of conformity and safety with each incremental changes?

5 MS. LUND: And is that specifically with regard to rates?

6 DR. WOODS: With regard to rate production.

7 MS. LUND: Thank you. Yes. We have a rate readiness
8 process. The rate readiness process is run by the airplane
9 program who's building the product. It starts usually more than a
10 year in advance of any given rate increase. It, as my colleague,
11 Mr. George, referred to, we do many of the things that he talked
12 about at Spirit, but it is a comprehensive list across the value
13 stream of what needs to be done to increase rate.

14 We ask the questions on staffing. We ask the questions on
15 capital equipment, tooling, engineering resources, and we have a
16 section at Boeing dedicated to the supply chain where we go out to
17 our suppliers. We ensure, as Mr. George described, that they too
18 are capable and ready of going up to rate.

19 We have at least monthly reviews in this process. Starting
20 about two to three years ago, with the implementation of our
21 safety management system, we also began to run a safety risk
22 management assessment for every rate increase so that we could
23 look for hazards, we could understand the risks of the system.

24 That is all part of this exercise, and it culminates in a
25 capstone event. I will also comment that as we go through these

1 monthly reviews culminating in the capstone, we also include the
2 FAA in those reviews. They are welcome to join us and in my
3 history, the last few years do attend at least virtually these
4 capstone events and these meetings, where we ensure that we are
5 ready across the board prior to approving or authorizing that rate
6 increase.

7 One other point that was brought up earlier is since the
8 accident, as a part of our ongoing dialogue with the FAA and our
9 comprehensive quality and safety plan, we have established a set
10 of six key performance indicators, or KPI's, that we are using to
11 roll up and indicate a healthy factory. We have set control
12 limits per these KPI's as part of our safety management system.
13 And we watch these control limits.

14 And our agreement with the FAA is going forward, these six
15 KPI's and our performance to those control limits, will also be an
16 added part of this rate readiness process.

17 DR. WOODS: And then similar to the question that I asked
18 Spirit, since COVID, when your demand did increase, have you ever
19 decided against a rate increase? And if so, what were the
20 considerations for that?

21 MS. LUND: We have, and in fact over the last two or three
22 years, we have decided against them much more than we have decided
23 for them. We delayed the rate, 31 and 38 rates on the 737
24 multiple times. The considerations and the primary reasons that
25 we delayed were twofold. Number one was supply chain readiness.

1 The feedback we got from the supply chain, are they ready. And
2 number two was the staffing and training of our own employees and
3 being ready there as well.

4 DR. WOODS: Thank you.

5 Mr. Cruz.

6 MR. CRUZ: Thank you.

7 Ms. Lund, what are the manufacturing documents used by Boeing
8 to build an airplane?

9 MS. LUND: There is a set of documents that we use similar to
10 what was described, but certainly it starts with an installation
11 plan. The installation plan is housed in our authoritative system
12 of record, which we call CMES. That common manufacturing
13 execution system, I believe Spirit referenced as just MES, but it
14 is our common system of record.

15 That is where our installation plans are housed. They
16 reference a set of drawings. They reference BPI's, which are the
17 processes we use to manufacture under and specifications as well,
18 which give engineering guidance. And then there is a set of
19 documents that we use, like nonconformance records as were
20 mentioned earlier, when there is a nonconforming condition that
21 needs to be documented as well.

22 MR. CRUZ: Can you please describe the Boeing production
23 document hierarchy?

24 MS. LUND: Our document hierarchy is authoritative
25 documentation, is which are those documents which our employees

1 work to, those are those housed in CMES. They are the
2 installation plan, the drawing, the documents that we must be able
3 to pull up to meet the code of federal regulations as we, as we
4 build product.

5 From a quality management system, we have our quality
6 documentation which is developed to ensure that we also comply
7 with all of the CFR's there. The hierarchy there really starts
8 with the CFR's, our quality manual, and then our policy throws
9 BPI's and process guides as you work down that hierarchy.

10 MR. CRUZ: The Boeing production documents show that there
11 are inspection points in the manufacturing records. How and who
12 determines these inspection points?

13 MS. LUND: The inspection points are decided similarly to as
14 was described earlier, by engineering, by our planning,
15 organization, by our manufacturing, or quality teams, as the case
16 may be. But we have a, we have, we have an abundance of
17 processes. We have a process that lays out the fundamental
18 guidance for how that happens, and we follow that guidance as
19 well.

20 MR. CRUZ: All right. Similar to the question that I asked
21 Spirit, what is the difference between the inspection accomplished
22 by a Boeing manufacturing personnel versus a Boeing quality
23 inspector?

24 MS. LUND: The inspector role at Boeing, like at Spirit, are
25 those who do an inspection. When employees do their work, they

1 place a stamp. The stamp, the authoritative media, the stamp as I
2 like to call it, is the document that an employee places that says
3 I've done my work. Manufacturing mechanics typically stamp their
4 work, stating that they did it in compliance with the requirements
5 when they build it. And inspectors stamp their work stating that
6 they have inspected it.

7 MR. CRUZ: Is there training or certification needed in both
8 cases?

9 MS. LUND: There are certifications required for both
10 mechanics and inspectors for certain activities. But as was
11 described, there are different job skill codes, and different job
12 skill codes perform different functions. An inspector is a
13 different skill code than a mechanic.

14 They are trained in those skills. We certainly recently have
15 done a great deal of enhancement to that training as well, but we
16 train them in those skills. And for certifications for specific
17 jobs or activities, they are provided those certifications when
18 required as well.

19 MR. CRUZ: And how often does Boeing review its processes and
20 documentation, and in particular, its BPI's, to ensure coherence
21 and clarity?

22 MS. LUND: We have a process document that ensures that we
23 review every BPI no longer than every five years. There are some
24 that we do every three years. And certainly we do them more
25 frequently if there are suggestions that there's something

1 missing, findings, concerns, within -- that come up within Boeing
2 or that come up from an audit, either internal or FAA, or whatever
3 it may be. We adjust more frequently, but every BPI will be
4 reviewed no longer than every five years.

5 MR. CRUZ: In each of the sections of the BPI, there's a
6 specific who roles affected that BPI. What is Boeing, what is
7 Boeing's expectation when it lists these roles?

8 MS. LUND: Our expectation is that for any BPI, that the
9 employees whose roles are affected will be following the
10 requirements of that BPI, specifically. It's a, it's a summary of
11 the people in their roles who would need to go to those BPI's,
12 become familiar with those BPI's, and ensure they are following
13 them.

14 MR. CRUZ: Can each of these roles flag an issue in the
15 production process if it was necessary?

16 MS. LUND: Each of these roles absolutely could flag an issue
17 in the production process. And people beyond just those roles can
18 also flag an issue if they see something wrong in the production
19 system.

20 MR. CRUZ: Can you please describe the process for
21 identifying a BPI that needs to be revised? The revision process,
22 and how are these audited, and obviously, you already said they're
23 set schedules when they're being revised, but --

24 MS. LUND: When we find that a BPI needs to be revised for
25 whatever reason, there's a BPI owner. That BPI owner is

1 responsible for the content of that BPI. We propose the
2 revisions, we sent it out to a group of employees, depending on
3 what the BPI is. Sometimes we have a workshop. Sometimes there
4 will be a team that is formed to work on it. Sometimes an
5 individual can make the changes, but it's routed for comments.

6 We also now have a approval panel within the quality
7 organization that if there are significant changes to that BPI, it
8 comes to the leadership team to also review that BPI. And then in
9 many cases, the contents of these BPI's are actually approved by
10 the FAA.

11 So after Boeing is comfortable with what we would like to
12 propose, we then sent it to the FAA for their review and approval
13 as well. And after all approvals are granted, it goes into
14 effect.

15 MR. CRUZ: So basically you, you say that you do solicit
16 feedback from manufacturing personnel when the BPI's need to be
17 revised. Is that correct?

18 MS. LUND: That is correct.

19 MR. CRUZ: So Mr. Catlin, can you please before I ask you a
20 follow up question to Ms. Lund, can you please tell us what your
21 role is and responsibilities for as an IAM business
22 representative?

23 MR. CATLIN: I'm a business representative in Everett,
24 Washington for the International Association of Machinists and
25 Aerospace Workers. And we represent the members who are on the

1 floor, who are building the airplane, inspecting the airplane.
2 Often, usually to our collective bargaining agreement, but we're
3 often engaged in conversations about things that are happening on
4 the floor as well.

5 MR. CRUZ: Would you care to comment on Ms. Lund's answer
6 with regards to soliciting feedback from manufacturing personnel
7 group, with regards to BPI revisions?

8 MR. CATLIN: Yeah. There is a process. When you get into
9 the system that stores all the BPI's, pros and policies, there is
10 a group of people who do perform writing reviews on each change to
11 each command media document. But these are not people that are on
12 the floor. They are people that are selected from manufacturing,
13 from quality, quality engineering.

14 These are not people who are down working on the airplane,
15 building the products, being forced to, or being required to
16 follow the processes that are defined in the command media
17 document.

18 MR. CRUZ: Ms. Lund, how are enhancements of the process made
19 and how is it filtered down to the production personnel?

20 MS. LUND: Enhancements to the process are made through the
21 revision process --

22 MR. CRUZ: Okay.

23 MS. LUND: -- that I think I just described. If you have
24 another question, I'm happy to answer it. And it's filtered down.
25 We have a weekly summary at this point that is flowed out to

1 employees, letting them know what's changed during the week. I
2 will comment that enhancing that process is one of the areas that
3 we are working on as part of our improvement plan as we've looked
4 -- tried to look very broadly at areas that need improvement.
5 Things we've heard from our employees that need improvement.

6 That is an area that needs improvement, and we are working on
7 ways to improve that, and collecting feedback from our employees
8 about ways that would be more effective to communicate those
9 changes.

10 MR. CRUZ: When a discrepancy or defect is found in
11 manufacturing, how is it recorded and tracked, Ms. Lund?

12 MS. LUND: When a discrepancy is found, it is recorded on an
13 nonconformance record. There are several times for the -- think
14 of simplifying, but generally capturing it, there are two kinds.
15 There is a nonconformance record which does not require a
16 disposition, as Mr. George described. Where -- or, I'm sorry, as
17 Mr. Grabon described, where a part can be brought to its drawing
18 configuration.

19 We sometimes call that a pickup. You may hear that word
20 here. Those terms are sometimes used interchangeably. And then
21 there is a disposition required NCR, where the part cannot be
22 brought back to its original configuration per drawing, at which
23 point we go to engineering.

24 We will get a disposition on that part to ensure that the
25 steps that we take to repair it are conforming, compliant, and

1 safe per engineering's definition.

2 Mr. Catlin, would like -- would you like to add to that?

3 MR. CATLIN: Yeah, no, she's correct. We have two -- we have
4 multiple different types of nonconformance. We've got the lowest
5 level nonconformance, which is a general pickup, which you can
6 return the airplane to condition without an engineering
7 disposition.

8 And then there is the engineering disposition tag that
9 requires engineering to give us a rework instruction on how to
10 return the airplane to a condition. And it's never going to be
11 returned to a per drawing condition, but it is a disposition that
12 allows us to build -- continue building the airplane out if it's
13 in the nonconformance management arena.

14 MR. CRUZ: Ms. Lund, how are out of sequence production tasks
15 handled? Is there, is there a specific procedure or process to
16 ensure the production steps aren't missed?

17 MS. LUND: Out -- there are, there are a few different ways.
18 But in general, when a job record, when an installation plan is
19 fired, which means it is due. It's come up on our system. It's
20 -- a work order is fired for us to build the aircraft. When that
21 is not complete, that stays with the aircraft record, that
22 paperwork stays open.

23 And as we proceed through the build, we ensure that all
24 paperwork has been accounted for. In terms of out of sequence
25 work, I want to hit a couple of items there. We have a BPI for

1 traveled work, for which it primarily describes the requirements
2 for traveling work once you leave the factory, and you were to go
3 to the ramp, we certainly operate by that BPI and have
4 traditionally.

5 Traditionally, in our factory, we have also had what we call
6 a precedence network, or a precedence network of critical jobs,
7 which we watch, and we make sure that this precedent network, that
8 the critical job prior to another job is complete prior to
9 starting to work on that job. And we used that precedent and that
10 work to also help us manage out of sequence work.

11 Lastly, I will state since the accident, we are significantly
12 changing how we manage traveled work. And so that is what I would
13 call pre-2024. Since the accident as a part of our improvement
14 activity, we are implementing a process where we are using safety
15 risk assessments through our safety management system, to assess
16 work when it travels out of position, to ensure that we have a
17 plan to work it, that it can be worked from a product safety and a
18 personal safety standpoint safely.

19 We identify how many positions in the factory floor it could
20 move before it could create a safety issue, or cover up work, or
21 increase out of sequence work. We do that and then we manage to
22 that, and again, that is just in implementation, but we are having
23 good results from that so far.

24 MR. CRUZ: Thank you. You mentioned that all the production
25 records are kept in CMES. What is Boeing's record retention

1 policy for all these records?

2 MS. LUND: Some records are required to be kept for life of
3 airplane. Other records are to be required to be kept for, I
4 believe it's one calendar year plus ten years, so slightly more
5 than ten years. There are record requirements and we abide by all
6 of those depending on the various pieces of the record.

7 MR. CRUZ: Thank you.

8 MS. LUND: So if you hear that, that's the acronym SAT that
9 we use for Shiplside Action Tracker. The SAT system is
10 fundamentally a communication tool. Next two areas of the
11 airplane, we have what we call a line side support center or an
12 LSCC. There are cross functional representatives who sit next to
13 the airplane.

14 Their job is to assist the folks building the airplane and
15 inspecting the airplane. The managers, the mechanics, the
16 inspectors, the fulfillment team, when they need help. They use
17 the SAT in order to help communicate. So if a mechanic were to
18 need something, he could go to the LSCC and put it in SAT, and it
19 communicates to different functions.

20 If they need a part, if they need engineering support, if
21 they need supplier support. It is a communication tool used to
22 let people know when, when the floor needs help, or needs
23 something.

24 MR. JOHNSON: As a follow up, who initiates the SAT?

25 MS. LUND: A SAT can be requested by anyone on the floor.

1 Typically it's someone in the line side support center who writes
2 the SAT.

3 MR. JOHNSON: Who is able to update the SAT?

4 MS. LUND: I believe it's typically, again, the people in the
5 line site support center, or those who are working in the SAT
6 system.

7 MR. JOHNSON: Per Boeing procedures, is a SAT, or Shipside
8 Action Tracker considered an official production record for the
9 airplane? Please explain.

10 MS. LUND: A SAT is a communication tool. That is not what
11 we call the authoritative system. SAT does not authorize an
12 employee to work on an aircraft. SAT, as I mentioned, requests
13 help. It lets people know if we need them to come to the
14 airplane, or it lets them know what's going on.

15 It allows us to elevate issues so management can get
16 visibility, can come and help when appropriate or reprioritize
17 work. It does not authorize work on the airplane. So in that way
18 it is not an authoritative system. That is done through CMES.

19 MR. JOHNSON: Switching gears, could you please explain the
20 mid, the mid position, the different configurations of a door that
21 are possible on a 737-9Max?

22 MS. LUND: Yes. Where there's a -- the mid exit door plug.
23 The two configurations. You can have a working door in which the
24 door is installed, it works just like a door that you see on an
25 aircraft with a handle, and it can be opened and closed, and it is

1 intended to do that on a regular basis.

2 Or if an airline does not want that door, they can have a
3 plug. The structural mid exit door plug. So on the fuselage
4 side, the cut out, for lack of a better word, that designed the
5 opening for the door will remain in the fuselage. And the plug
6 acts as a structural element to close that.

7 So when you look at it from the inside of the aircraft,
8 you'll see nothing there. It's not intended to open. So the seat
9 rows and the interior, which bins and things can continue right
10 through that. If it's a door, you obviously have to have an
11 opening for people to exit for that door to be opened, et cetera.
12 So you could have a structural plug, or you could have a working
13 door.

14 MR. JOHNSON: Is the MED plug considered primary structure?

15 MS. LUND: I will only pause on the word primary. It is
16 considered a structural element of the aircraft.

17 MR. JOHNSON: And what does it mean to be a structural
18 element to the airplane?

19 MS. LUND: A structural element of the aircraft means that it
20 is intended to carry structural loads. It is intended to operate
21 as a piece of structure, not as a moving component. But it is
22 intended to be a part of that structure of the fuselage.

23 MR. JOHNSON: Why did Boeing introduce the MED plug option on
24 the 737-9Max?

25 MS. LUND: I was not on the program at the time, so I will

1 start by saying it was originally designed and implemented on the
2 737-NG. That design was carried over to the Max, but it was
3 introduced on the NG, I believe around the 2009 timeframe.

4 I believe it was introduced because some of our customers
5 wanted to carry enough passengers that we needed another exit door
6 to meet the requirements. You have to have so many exit doors, so
7 many -- such a distance apart, in order to meet the evacuation
8 requires -- requirements of the --

9 We had customers who wanted to carry more passengers. There
10 was another door that was needed. I believe that was the original
11 purpose of that door. And then there were other customers who
12 came back that did not want that door. So the design solution was
13 keeping the baseline fuselage design similar, and then allowing a
14 customer to either have a working door or a plug, depending on the
15 configuration they were choosing.

16 MR. JOHNSON: How is traveled work defined at Boeing?

17 MS. LUND: Traveled work is defined as work that does not get
18 completed in the position in which it was originally intended to
19 do. So if we fire a work order for a job to get completed in flow
20 day three, and it doesn't get completed in flow day three and
21 remains open, that would be considered traveled work, which had
22 traveled to flow day four.

23 MR. JOHNSON: Can you describe how the rate of traveled work
24 has fluctuated over the last decade on the 737 production line?

25 MS. LUND: Traveled work historically through, through my

1 experience with Boeing, has gone up and down periodically through
2 the years. And that is something that I've seen repeatedly
3 through my history. The 737 data represents that as well. There
4 are times when traveled work will go up somewhat, and there are
5 other times when it comes down to a very low level. Again, very
6 much as Mr. George described it for Spirit.

7 MR. JOHNSON: Could you please describe to us the BPI 1581
8 removal process?

9 MS. LUND: BPI 1581 is our Boeing Process Instruction Guide
10 that talks about the need to -- when the need comes up to remove
11 parts from an airplane, a job which had been previously completed,
12 a part that is installed and stamped off on an airplane, needs to
13 be removed for whatever reason or condition. BPI 1581 is the
14 documentation that gives the processes and the requirements in
15 order to remove that part or assembly.

16 MR. JOHNSON: Does this BPI used, or process used across all
17 Boeing production facilities?

18 MS. LUND: It is. Boeing commercial airplanes, I can speak
19 for, yes.

20 MR. JOHNSON: What is the formal training given to a
21 manufacturing personnel who's allowed to write removals? And
22 again remember this is September of '23.

23 MS. LUND: Thank you. In September of 23, the primary
24 training that would have been given initially would have been the
25 on the job training for an employee who comes into a role, would

1 be trained on the job when they needed to do that work. And then
2 to supplement that, particularly as it relates to removals, when
3 an issue is seen or something is happening, we will also issue
4 quality alerts.

5 And the -- there had been several quality alerts related to
6 BPI 1581, which would supplement an employees knowledge or a
7 reminder of that BPI.

8 MR. JOHNSON: Okay. Back in September, was there any
9 recurrent training for personnel who wrote removals?

10 MS. LUND: There is recurrent -- there is training for BPI
11 1581. There is an initial training for BPI 1581 that people
12 needed to take. As of September of 2023, the best of my
13 knowledge, there was not recurrent training. There is now.

14 MR. JOHNSON: What is your overall assessment of BPI 1581?

15 MS. LUND: At the risk of giving an opinion and not a actual
16 statement, I think it's fairly factual. I would say it is
17 detailed. There is a lot of data. And it is complex. As a part
18 of our initiative to simplify much of our command media, BPI 1581
19 with removals has its very own element of our comprehensive plan.
20 It's a, it's a sub swim lane all its own because we know we really
21 do need to simplify that BPI.

22 MR. JOHNSON: Okay. Thank you.

23 Mr. Catlin, what is the IAM's role in the aircraft
24 manufacturing process at Renton?

25 MR. CATLIN: It's our members who do the manufacturing and

1 the quality inspections on the airplane from the beginning to end.

2 MR. JOHNSON: How many IAM workers are there in the Puget
3 Sound area for Renton?

4 MR. CATLIN: In Renton alone, I think we're at about 11,000.
5 Throughout the IAM in Puget Sound, we're about 33,000.

6 MR. JOHNSON: How many IAM members are FAA airframe and/or
7 power plant certified?

8 MR. CATLIN: I do not have that now.

9 MR. JOHNSON: Do you know if there are certain job groups
10 that require an FAA certification, AMT's, to be in that group?

11 MR. CATLIN: They're used to be. Yeah. Our AMT's aircraft
12 maintenance technicians, aircraft maintenance technicians
13 inspectors, used to, but that requirement went away several years
14 ago.

15 MR. JOHNSON: Okay. What does the IAM do to help new members
16 be successful in aircraft -- in the aircraft manufacturing process
17 at Boeing?

18 MR. CATLIN: Well, currently we are in the process of
19 starting our machinist institute, where we will be providing some
20 preemployment training. We refer to it as red light, green light
21 training. But at this, at this point in time we do have one
22 center open down in the Seattle area. The training of employees
23 per the BCA quality manual section 7.1.2, is the responsibility of
24 the Boeing Company.

25 MR. JOHNSON: How does the IAM promote safety to its members

1 at Boeing?

2 MR. CATLIN: Well, we have an -- we have, through our joint
3 programs, we have several different processes that we have. We've
4 implemented the share process that allows employees to, you know,
5 working with Boeing, allows them to implement safety issues,
6 concerns that get elevated up through management.

7 We have Article 16 in our collective bargaining agreement.
8 We also have entered into the triparty agreement with the Boeing
9 Company, which is part of the speak up process. And when our
10 members have concerns about safety or quality on the airplane,
11 they can file a speak up report, which goes to the team, gets
12 evaluated by regulatory quality, systems oversight, then goes to
13 our members on the triparty agreement, has visibility with the FAA
14 as well.

15 MR. JOHNSON: Have you ever -- or what do you know about the
16 SAT system at Boeing?

17 MR. CATLIN: SAT system is a system that I have used several
18 times, many times throughout my career at the Boeing Company.
19 It's a communication tool. Depends on what the issue is. As a
20 quality inspector, I often ran into planning errors on
21 installation plans.

22 Some of them would require manufacturing engineering. Some
23 of them would require quality assurance planning. I could write a
24 SAT to get ME engaged in addressing the planning error. Quality
25 assurance planning used a different process. But if manufacturing

1 needs a part, they would write a SAT. It's literally a
2 communication tool. It has no authority to change the
3 configuration of the aircraft.

4 MR. JOHNSON: Is it an effective tool?

5 MR. CATLIN: To get the help needed, absolutely.

6 MR. JOHNSON: What type of training do IAM personnel receive
7 regarding the use of BPI's in the production process?

8 MR. CATLIN: Very little. In our initial training there is
9 some discussion about it, but there's no official training to how
10 to access the system, which is referred to as 1PPM. That's where
11 all of our command media documents are stored.

12 Very little training on anything about the BPI. There's not
13 a lot of training. You will find in the IP's, there will be
14 references to a BPI. But prior to -- back before 2017, we had
15 something called required reading. And every Friday we would get
16 a notification in our email saying that there has been a change to
17 a BPI, a policy, or a pro that would affect our organization.

18 And then we would have a requirement to go in, review those
19 changes, and then we would have to acknowledge that we have
20 reviewed them. 2017, that stopped. That -- it became recommended
21 reading, and then that kind of went away and now we're down to in
22 the north plant up in Everett, we see tip sheets. Down in the
23 south, in the Renton plant, we see quality alerts.

24 But other than that, there's nothing that really tells our
25 members when a BPI has changed and when you look specifically at

1 BPI 1581, since October of 2010, that BPI has changed 35 times.
2 It went from 28 pages to 58 pages. And nobody really knows what
3 those changes are.

4 MR. JOHNSON: What does the IAM tell its membership to do if
5 it finds a issue with a BPI?

6 MR. CATLIN: Usually it's reported, put in a speak up. That
7 that is one of our only avenues. You can take it to your manager,
8 you can take it to the LSCC. But if you want to drive action, you
9 can put it in either through a SAT or you can report it up through
10 speak up. And then it will usually get it right.

11 MR. JOHNSON: How does the IAM promote the criticality of
12 manufacturing an aircraft to its membership?

13 MR. CATLIN: Well, we do it through, number one, on our, on
14 our onboarding. We have our opportunity to meet with every new
15 hire that's going to come into the IAM on day one. We have a
16 conversation with them about that point, and then we hold our
17 local lodge meetings.

18 We have, you know, communications with them. But we don't
19 have an arena where we are participating in Boeing training, where
20 we are an active participant in any of these. Most of the
21 training, it falls on the responsibility of the Boeing Company
22 through their quality manual.

23 MR. JOHNSON: Okay. Thank you.

24 Mr. Cruz.

25 CHAIR HOMENDY: Can I -- can we just break for a second? So

1 we are going to take a ten minute break, ten minutes is good. Ten
2 minute break. We're going to break, well, actually, I'll leave it
3 to 11:05. A little more than ten minutes. We're when we come
4 back, we're going to come back to the technical panel.

5 One thing I want everyone to do, see where my microphone is
6 right in front of my mouth, right. Don't be afraid of it. Come
7 right up to the microphone. And here's why. It's not just
8 because we have people in the room. We've got fans back here, you
9 know, but people online, thank you Gail for emailing me, cannot
10 hear.

11 And so they are straining to hear. This is -- we are a very
12 transparent agency. We want people to be able to follow along.
13 And it's not just witnesses, but also the technical panel. So --
14 and we're also straining up here. So right here is your
15 microphone. Don't be afraid of it. Talk right in. Speak up.
16 Okay.

17 And then for the camera, there is a request to see name tags
18 so people can see who's speaking if they're remote. So if we
19 could back that up a little bit so that people can see name tags
20 and follow along on who is speaking, both on the technical panel,
21 the witness table, and amongst the parties. We want to make sure
22 that everybody can participate, whether they're here or not.

23 So thank you. We will be back at 11:05.

24 (Off the record)

25 (On the record)

1 CHAIR HOMENDY: Those on the technical panel can come back.
2 The witnesses are here. Everybody be seated. Thank you. All
3 right.

4 Mr. Cruz, I'm going to let you start whenever you're ready.

5 MR. CRUZ: Thank you, Madam Chair.

6 This question is for Mr. George or Mr. Grabon. You guys
7 decide who would answer these questions. Spirit previously shared
8 that there are 288 suppliers in making the 737 fuselage. Who are
9 your major suppliers?

10 MR. GEORGE: Oh, let's see. TAI out of Turkey would be one
11 of them. Orizion, the PCC companies, Korean Air, KAI.

12 MR. CRUZ: Okay. Does Spirit have any suppliers that work in
13 the Wichita factory?

14 MR. GEORGE: You know, we from -- yes. So on, for example,
15 on the 787, the wiring that's done on the 787 associated with the
16 floor grid is done by a third party from -- but that's pretty
17 unusual, and from there, mainly if we have a quality issue, for
18 example, then we'll invite the supplier in to help.

19 MR. CRUZ: All right. I guess what types of controls are --

20 CHAIR HOMENDY: Can you, can you all hold for a second?
21 Whoever's back there at the door, if you could close the door, or
22 come in, or leave and take your conversations outside. Thank you
23 so much. Continue on.

24 MR. CRUZ: I'll ask the question again. What types of
25 controls are in place for the supplier work, and who is

1 responsible for their work?

2 MR. GEORGE: Well, our supply chain organization is
3 responsible to manage the supplier. They are responsible for
4 their work generally. If it's, if it's a nonconformance, for
5 example, that they're in our factory repairing.

6 MR. CRUZ: And what types of audits does Spirit conduct on
7 the suppliers, and how often is it done?

8 MR. GEORGE: Audits relative to them working internally with
9 us?

10 MR. CRUZ: Yes.

11 MR. GEORGE: I don't know that we have any audits relative to
12 that. I can say it's very unusual for a supplier to be working
13 within the four walls of Spirit.

14 DR. WOODS: Madam Chair, I guess I just want to clarify the
15 question. Pocholo, are you talking about audits that we conduct
16 on the suppliers themselves at the supplier facility?

17 MR. CRUZ: No. It's basically suppliers within Wichita, the
18 plant, itself.

19 DR. WOODS: Okay. Thank you.

20 MR. GEORGE: Yeah, I think I answered that.

21 MR. CRUZ: Okay.

22 So how many supplier auditors does Spirit have?

23 MS. PALAZ: We have a supplier audit group, and I'm going to
24 just throw out a number here. It's 30 or 40 in terms of Spirit
25 personnel that conducts that.

1 MR. CRUZ: Is there a certification or training for this --
2 for these personnel to be auditors?

3 MR. GEORGE: Not that I'm aware of.

4 MR. CRUZ: So how are, how are the auditors work plans
5 determined by Spirit.

6 MR. GEORGE: Again, are we talking in -- now we're talking in
7 the supply base or --

8 MR. CRUZ: Basically, your Spirit auditors that look at your
9 suppliers themselves.

10 MR. GRABON: I think I can take that one, Terry. So Spirit
11 audits its -- can you hear me okay?

12 MR. CRUZ: Yeah.

13 MR. GRABON: Okay. Spirit audits its suppliers. We have, we
14 have a, like Terry mentioned, a supplier quality audit team. They
15 regularly go out to the suppliers. They'll be on site with the
16 suppliers looking at their processes and their procedures. We
17 regularly audit suppliers similar to how Boeing will come in and
18 audit Spirit.

19 So looking at, looking at the scope and scale of the
20 supplier, and looking at their procedures depending on what
21 they're delegated to do, some delegator -- some suppliers can be
22 have delegated inspection, for instance, at which point we'll
23 perform audits on their inspection processes and procedures.

24 MR. CRUZ: So is there any communication then with Boeing
25 with regards to some of your audits?

1 MR. GRABON: Can you expand on the question?

2 MR. CRUZ: Yeah. I mean it -- so during your findings in
3 these audits, is there a reason or is there a tool communicated
4 between Spirit and Boeing with regards to some of those audit
5 findings?

6 MR. GRABON: Generally only, we only refer those findings
7 back to Boeing if there's been an escape of some kind through one
8 of the suppliers. Otherwise it's Spirit's oversight of the
9 supplier. Does that answer your question?

10 MR. CRUZ: Yes.

11 MR. GRABON: Thank you.

12 MR. CRUZ: Dr. Woods.

13 DR. WOODS: Thank you.

14 Mr. Ackerman, I believe you're the only one who hasn't had an
15 opportunity to tell us about your roles and responsibilities as
16 the VP of supplier quality. Would you please do so now?

17 MR. ACKERMAN: Thank you for the question. I did cover my
18 roles and responsibilities, but just to reiterate, I do have
19 responsibility for all of the parts, whether it's our external
20 supply chain and overseeing the suppliers, or our internal
21 fabrication division.

22 DR. WOODS: Thank you for that. So for BCA, approximately
23 how many suppliers does Boeing have?

24 MR. ACKERMAN: It varies over time, but roughly speaking, we
25 have about 1,200 active suppliers right now.

1 DR. WOODS: And similar to the questions that we presented to
2 Spirit, about how many supplier quality auditors do you have
3 within the organization?

4 MR. ACKERMAN: I have about 200 auditors that are distributed
5 around the world under an organization that I have that's supplier
6 facing. I have a team that covers Europe. I have two different
7 teams that cover North America. I have a team that covers Asia
8 and Southeast Asia.

9 DR. WOODS: And do these employees have any sort of specific
10 training or certification that they need to be an auditor?

11 MR. ACKERMAN: They do have training on their auditor
12 function, the supplier quality representatives, yes.

13 DR. WOODS: And for certification purposes, is there any sort
14 of certification that they require?

15 MR. ACKERMAN: I don't believe there are specific
16 certifications with the exception of we have a group that oversees
17 special processes, things like anodizing or nondestructive
18 testing, and I believe they do have certifications.

19 DR. WOODS: And is the training a one time thing or is there
20 a recurrent training?

21 MR. ACKERMAN: There is both onboarding training and then
22 there is recurring training.

23 DR. WOODS: Can you generally describe for us what type of
24 audits Boeing conducts on its suppliers?

25 MR. ACKERMAN: There's a variety of different audit tools we

1 use. Typically, there's -- our one common tool is a quality
2 management system audit. It's in some ways similar to an audit to
3 the AS9100 standard, but it's evaluating the internal procedures
4 and policies of the supplier and their adherence to those
5 policies,

6 But we also have tools that are more part specific. So we'll
7 do an audit of the production of an individual part at a supplier,
8 or we'll do a manufacturing process audit where we take a type of
9 manufacturing process and audit the production of multiple parts
10 that go through that process.

11 DR. WOODS: And what sorts of timelines are you considering?
12 Is it quarterly, yearly, monthly?

13 MR. ACKERMAN: We do have -- each supplier quality
14 representative has a region, and they'll touch each one of those
15 suppliers at least annually, but typically more than that. It is
16 somewhat risk-based today where we see the -- we see a particular
17 set of risks that would warrant more audits.

18 As part of the comprehensive plan, we're moving to a more
19 structured oversight where we have more forward-looking data that
20 comes into our systems, an evaluation system, and then a more
21 risk-based driven engagement with the supplier.

22 And I should add, and then there are some suppliers where we
23 have a full time on site presence. Typically major structure
24 suppliers. There are some other facilities where we do have full
25 time presence.

1 DR. WOODS: And how are the results of these audits
2 communicated and to whom are they communicated to throughout the
3 Boeing company?

4 MR. ACKERMAN: So the audits would, if there are any findings
5 as a result of an audit, that would get documented and submitted
6 to the supplier in the form of what we call a SER, a supplier
7 evaluation request. We log all of those SER's. So we see
8 internally in our data systems where we have repeat findings that
9 a supplier or where we have an audit that would indicate a higher
10 level of risk, and indicate future action is needed.

11 DR. WOODS: So along that same vein, what controls are in
12 place for your suppliers to ensure that they're adhering to
13 Boeing's quality standards?

14 MR. ACKERMAN: I would say that the primary control is those
15 audits, where we go out and do those evaluations at the supplier.
16 But we also look at a broader data set for all of our suppliers.
17 We look at defect rate, we look at, Scott described earlier,
18 notice of escape. We look at notice of escape rates from
19 suppliers. We look for trends in that data that would indicate
20 additional oversight, responsibility, or escalation with the
21 supplier is required.

22 DR. WOODS: Prior to the accident occurring, how often was
23 Boeing auditing Spirit, for instance?

24 MR. ACKERMAN: Spirit is one of the suppliers where we have a
25 full time on site team. We have about 15 people, I believe, that

1 are dedicated to an audit function. That was, that was prior to
2 both the accident and the manufacture of this fuselage. So it's
3 roughly on a, it's roughly on a two week cycle.

4 DR. WOODS: And has that changed since the accident?

5 MR. ACKERMAN: We have, we have brought additional auditors
6 in. We also support ongoing FAA audits at Spirit as well.

7 DR. WOODS: You said additional auditors, but has the rate of
8 audits also increased?

9 MR. ACKERMAN: I don't think the rate of audits has increased
10 since the accident. No.

11 DR. WOODS: Prior to the accident occurring, eye level, what
12 sorts of issues were the auditors finding with their audits of
13 Spirit?

14 MR. ACKERMAN: The frequent types of audit findings we were
15 identifying and writing up were things like control of FOD,
16 foreign object debris, tool control, protection of parts, and
17 compliance with manufacturing plans were I'd say the most common.
18 Or accessibility to manufacturing plans would be a better way to
19 frame it.

20 DR. WOODS: And has the rate of supplier generated defects
21 changed over the five -- last five years, and if so, how has it
22 changed?

23 MR. ACKERMAN: If you were to look at a five year window
24 specific to the 737 fuselage or broader than that?

25 DR. WOODS: Specific to the 737.

1 MR. ACKERMAN: We have seen ups and downs in the data. We
2 saw some elevation going on in late 2022 going into 2023. And we
3 started taking escalation steps as a result of that.

4 DR. WOODS: What do you mean by escalation steps?

5 MR. ACKERMAN: We started with increasing the size of the
6 team we had on site. It was in about May or June of 2023 that I
7 put a senior director on site to have a supplier quality executive
8 lead the team there. We started increasing the team and then in
9 May of 2023, we started introducing Boeing inspections where we
10 would actually do inspections in the Spirit production system.

11 We identified some specific areas based on a risk assessment
12 that we did at the time. And we did that risk assessment
13 concurrent with Spirit, particularly Spirit engineering.

14 DR. WOODS: Thank you.

15 Back to Spirit, Mr. George, can you please describe how your
16 workforce demographic has changed over the last decade or so? And
17 by demographic, I specifically mean experienced, prior experience,
18 and manufacturing skill, longevity with the company, that sort of
19 thing.

20 MR. GEORGE: Would characterize it five years ago before, 95
21 percent, 95 percent of the folks that we brought in had sheet
22 metal experience and assembly. Now it's completely opposite.
23 It's, you know, five percent of the folks that we bring in have
24 sheet metal experience.

25 Therefore, over that same time period, we've gone from a two

1 week training to currently we have a six to eight week training.
2 Again, going through blueprint reading, work instructions, how to
3 drill, how to install fastener or sealant, those type of things.

4 DR. WOODS: What kind of assessments or safety risk
5 assessments has Spirit done on how these changes in your workforce
6 have affected quality control?

7 MR. GEORGE: You know we are in the very beginning of our SMS
8 journey, and I think that that would capture it for the most part.
9 Other than that, we haven't done much of a risk assessment
10 relevant to the tenure of our sheet metal mechanic.

11 DR. WOODS: Outside of extending the training by several
12 weeks, have there been any other mitigations that Spirit has put
13 in place to try to bridge that gap between experience and skills
14 that you're seeing today?

15 MR. GEORGE: Not specifically. Again, we try to launch
16 countermeasures relative to things like bar charts, which is
17 specific instructions breaking the work down as to the simplicity
18 that we can, and then working with each of the mechanics in the
19 line side teams, which we have that, as well as Boeing. Working
20 with each of the teams to better understand their defects, root
21 cause, and then corrective action plans and such.

22 MR. GRABON: Can I, can I just add it to that a little bit?
23 One of the things that we have done is we've brought in what we
24 call workplace coaches. These are generally retired mechanics
25 who've done that type of work before. They don't, they don't want

1 to come back as full time, but they will, they will come back in.
2 They will oversee some of the build, some of the IP's that they
3 were familiar with when they, when they built the product.

4 DR. WOODS: Who is ultimately responsible for training Spirit
5 personnel to work on Boeing products, both in Wichita and in
6 Renton?

7 MR. GEORGE: We have a core training group in Wichita that is
8 responsible for training our personnel. And that would be for
9 both the folks in Wichita and Renton.

10 DR. WOODS: Are any Spirit employees required to have
11 certifications to perform work?

12 MR. GEORGE: Yes. Again, you know, we're kind of mainly
13 talking about sheet metal mechanics and 737's, but I have a whole
14 fabrication division. We have inspection to where everything from
15 nondestructive inspection, certification, and then to the higher
16 levels of the mechanic relative to certifications for them.

17 DR. WOODS: Would you please give us an overview of what
18 types of training are recurrent?

19 MR. GEORGE: We have pretty much everything. So I'd start
20 with, we have online training, a training system. So
21 periodically, every employee there's a, there's a term in there
22 that they will train every six months, et cetera, depending on
23 what the training is.

24 DR. WOODS: How often is your training audited to ensure that
25 it's producing the results that you want?

1 MR. GEORGE: Yeah, I think it would be more of an internal
2 audit. I don't know that we have anything formal, but we
3 obviously are in constant communication with our training leaders,
4 and the activity on the floor, and how the latest group that just
5 went through training, how they're performing, et cetera.

6 DR. WOODS: And then my last question on this subject is, do
7 Spirit production personnel in Wichita require any sort of special
8 training or certification to install a MED plug?

9 MR. GEORGE: No, not specifically.

10 DR. WOODS: Going back to Boeing, please. Ms. Lund, can you
11 describe your workforce demographic? And again, to reiterate, by
12 demographic, I mean experience, prior experience, and
13 manufacturing skill, longevity with the company, that sort of
14 thing, and how it has changed over the last decade.

15 MS. LUND: Yes. Similar to Mr. George, prior to COVID, we
16 had a experienced workforce, which we still do. But a more
17 experienced workforce. And when we were hiring new employees,
18 more of our new employees, most of our new employees had some
19 aerospace experience.

20 We would hire them from the military. We would hire them
21 from MRO's, or even a technical school, but someone who had some
22 training in the aerospace. Coming out of COVID, when we really
23 started ramping up our hiring, we had had quite a bit of attrition
24 in 2020, the year during COVID.

25 When we came out of that and started ramping up our staffing,

1 we found that considerably more of our employees did not have that
2 aerospace experience, or applicable experience in the job. And
3 the -- both the number of employees that we were hiring and the
4 lack of experience, I would say really started that demographic
5 shift.

6 DR. WOODS: So what kind of change assessments were made
7 considering that difference in what you had previously in terms of
8 experience and skill, and then what you have now?

9 MS. LUND: And we recognized by the end of 2022, and even had
10 a risk assessment recognizing that we had an issue. And in 2023,
11 we went back and tried to enhance our training program. We did
12 enhance it.

13 Our training program has two fundamental elements to it. The
14 first is what we call our foundational training center. That's
15 more what I'll call our classroom training, our initial training
16 when you come into the company. And then there's an on the job
17 training that you get when you're down on the floor.

18 We enhanced our foundational training in 2023. We made
19 improvements. But quite frankly what we heard from our workforce
20 loud and clear this year when we began our quality and safety
21 stand downs, is that we had more work to do. And since that time,
22 starting with this year, we have made significant enhancements
23 both to our foundational training, as well as to our structured on
24 the job training.

25 DR. WOODS: Are there any other controls or mitigations that

1 you have put in place besides training to ensure the bridge
2 between that experience and the current skill?

3 MS. LUND: Yes, and so we'll start with training because
4 that's important. On our foundational training, we have added
5 over 300 hours of curriculum. We have gone back and really
6 overhauled the curriculum. We've added significant elements on
7 the safety management system, the importance of safety in being an
8 aerospace mechanics. We've started there.

9 When it comes to on the job training, we've really moved to
10 what we call now structured on the job training with several
11 elements. We have an electronic dashboard. We track every
12 employee. Every employee is assigned a peer mentor on the floor
13 when they leave for structured on the job training.

14 We no longer allow employees, mechanics or inspectors, to
15 stamp jobs. We don't give them the authority in CMES as discussed
16 earlier, to stamp jobs until they've successfully completed
17 structured on the job training. That involves things like you
18 have to have done the job you're going to be doing X number of
19 times.

20 On the 37, It's a minimum of ten times for each job you're
21 going to do with a peer mentor. You have to have done it with
22 high quality. You have to have passed your compliance assessments
23 showing that you can do these assessments. Your peer mentor has
24 to buy off that you're ready. There's a self-assessment that now
25 an employee has to say yes, I'm comfortable, and a manager has to

1 buy that off.

2 So it's very structured. You don't get the ability to stamp
3 until you pass through that. And then we've come back and also
4 added workplace coaches. Since the time of the accident, we've
5 hired 160 additional workplace coaches. We now have over 250
6 across our programs.

7 They're on the floor, they're there on all shifts. They're
8 available for any employee at any time to say I have a question,
9 can someone come assist me. We have a broad array of skills and
10 experience so that they can help with many different functions out
11 there on the floor.

12 And lastly, what I will say is as a part of this, knowing
13 that we needed to do more to our training, we went back to every
14 mechanic who'd been there a year or less, and every inspector
15 who'd been there two years or less, and did some basic assessments
16 ensuring they had the skills as well.

17 It wasn't an ongoing gap. And if they struggled through
18 those assessments, we provided more training. And we now are 100
19 percent through those assessments with those employees. And so we
20 took steps there as well.

21 DR. WOODS: Apologies. Can I just ask for the board of
22 inquiry, is that now after the accident, you've done all that or
23 before?

24 MS. LUND: The last part that I just talked about is since
25 the accident and it's part of our improvement plan.

1 DR. WOODS: Thank you.

2 MS. LUND: Thank you.

3 DR. WOODS: How is the training documented and archived for
4 personnel?

5 MS. LUND: The exact system of how it's done, I can't speak
6 to. But what I can speak to is we do have required training. We
7 have safety required training, both personal and product safety
8 required training. And we do keep those records. We when you --
9 we have required learning. We have a system that comes to each
10 one of us called My Learning.

11 There's required learning, you go in and do it. If you're
12 doing it in a group setting, someone goes in and records your
13 taking of that class. So those records are there, and we can
14 ensure that all employees have required -- have received all the
15 required training.

16 DR. WOODS: And to be clear, is this as of last year or when
17 did this start taking place?

18 MS. LUND: This has been a long time system. I don't have
19 the exact date, but for many, many years. As long as I can
20 remember.

21 DR. WOODS: Can you speak to the differences in training for
22 inspectors and quality personnel?

23 MS. LUND: Yes. When mechanics come in, everyone goes
24 through sort of a foundational training where -- to ensure they
25 know how to read a drawing, they know how to access the systems.

1 This kind of a thing. For mechanics at that point, they peel off
2 so that it's really more about their job, their job function, that
3 they've hired into.

4 For inspectors, we have a higher level of training for things
5 like our process inspections -- instructions, our BPI's. It's
6 important to us that the inspectors have that higher level of
7 familiarity with all of our BPI's, our requirements that they can
8 pull product data.

9 We call that pulling the drawings, the specifications, et
10 cetera. That they have more familiarity with those kinds of
11 activities and our training is set up around that. We also have
12 some additional specific training inspectors, or the people who
13 write rejection tags. We work with them on that.

14 We have a training element for how you correctly identify the
15 location, we call it a three-point location, on an airplane. How
16 you identify a three-point location on airplane, things like that
17 are included in a quality inspector training.

18 DR. WOODS: Do you have any sort of metric that tracks the
19 effectiveness of Boeing's training program?

20 MS. LUND: We've been really working since the accident, for
21 the sake of clarity, to make sure that we have a closed loop
22 system. So we now are tracking feedback from the peer mentors and
23 the employees when they come out. We track the employees self
24 assessments. We ask them how they're feeling, and then we track
25 the quality of the work that these employees do.

1 Also, we track the compliance activities. We have by
2 compliance activities, I mean things like maintaining your tool
3 control, storing work in process parts appropriately, checking
4 your area for FOD, ensuring that that the area is per process. So
5 we're checking those records as well, and we're feeding that all
6 back into our training process.

7 As well as certification issues or failures, if we see
8 employees who are taking the test to get their certifications not
9 passing, we're now feeding that back into training so we can
10 strengthen that training as well.

11 DR. WOODS: So to be clear, these were things that were not
12 in place prior to January of this year.

13 MS. LUND: We would more informally track it prior to this
14 year. We would get feedback from the floor. That's how we knew
15 we needed to improve hire. But it wasn't the formally documented
16 closed loop process that we've put in place since the accident.

17 DR. WOODS: Has Boeing ever sought external audits and
18 validation of their training program?

19 MS. LUND: I am not aware that we have sought an external
20 audit for our training program. We have external trainers who
21 come in in some locations, but I'm not aware of the audit process
22 there.

23 DR. WOODS: Thank you.

24 Mr. Johnson.

25 MR. JOHNSON: Next group of questions is for Spirit

1 AeroSystems.

2 Prior to the accident, what type of final inspection was
3 accomplished at Spirit before the fuselage was shipped to ensure
4 the product Spirit was producing was delivered to Boeing, and it
5 conformed to the highest standard?

6 MR. GRABON: So throughout the build process, Spirit performs
7 several different kinds of inspections. So for each IP that we
8 spoke of earlier, the build production paperwork, there's in
9 process inspections that occur along the way. What that means is
10 in order to proceed through the build, certain items may need to
11 be inspected and recorded.

12 So for instance, hole diameters, verify the shim gaps, those
13 types of things. Upon the completion of each one of the jobs,
14 then there's a final inspection that's performed by a Spirit
15 inspector, validating that the job has been completed, all the in
16 processes are completed as well, to satisfy the engineering
17 requirements.

18 Upon completion of all the IP's that make up the fuselage, at
19 the very end of the line, there is a -- we'll do a final FOD walk.
20 Boeing actually participates in the in the final FOD walk prior to
21 our implementation of final product verification. So Boeing and
22 Spirit, well, first Spirit goes on to the aircraft, validates that
23 there's no FOD. Then the Boeing team comes in after that. They
24 do a FOD sweep as well. Once that's completed and everybody is
25 satisfied, then the fuselage are shipped to Boeing.

1 MR. JOHNSON: And that was before September of '23?

2 MR. GRABON: Correct.

3 MR. JOHNSON: Has the process changed since the accident, and
4 if so, how?

5 MR. GRABON: Yes. The process has changed in that now there
6 is an additional process called final product verification. So
7 everything I just spoke up to this point remains the same with the
8 exception of the Boeing FOD walk at the, at the very end of our
9 assembly.

10 What you saw in the video is the units go from the assembly
11 line onto a rail car and up to Renton. Now the procedure is once
12 Spirit finalizes the build and final inspections of the aircraft,
13 the aircraft then goes through what we call final product
14 verification.

15 Final product verification, we basically take that completed
16 fuselage. It is inspected by the Boeing team and the Spirit team,
17 defects, anything that was not found in the initial manufacturing
18 and inspection, Boeing and Spirit will record -- Spirit records
19 the, records the defect, reworks the defect. Boeing then goes and
20 buys back, ensuring that the defects have been reworked to
21 standard. And then the unit is shipped.

22 MR. JOHNSON: In general, what changes to the processes or
23 policies have been implemented since the accident at Spirit?

24 MR. GRABON: So several things have been implemented. The
25 final product verification is probably the biggest change. In

1 addition, there's also in process inspections that have been
2 added.

3 So for instance, currently, I believe the number is 50,
4 Boeing in process validations. What that means is Boeing has
5 identified 50 places throughout the build of the fuselage that
6 they would like to perform an inspection on after Spirit inspects.

7 So for instance, the first five steps of a, of a procedure,
8 Spirit will validate that the work is done properly. Boeing then
9 will perform an inspection, and they will also sign off in our
10 system, allowing it to move forward.

11 MR. JOHNSON: Okay.

12 Ms. Lund, what type of receiving inspection is accomplished
13 on the fuselage once it arrives at Renton? This is, this is
14 September '23, remember.

15 MS. LUND: Yes. In the time frame of September '23, when a
16 fuselage arrived at Boeing, either on flow day one or what we
17 sometimes referred to as flow day zero, which is a informal
18 position. Really, it just meant let's pull it early and look. We
19 did a inspection of the fuselage to look for defects that had come
20 up before in our production system.

21 It primarily related to things like skin quality. We would
22 check to make sure that the skin was flat, that it was conforming.
23 We would check the fasteners to make sure that they were per
24 specification throughout the airplane. We would check for FOD, as
25 was mentioned, to make sure that the airplane is clean.

1 And so at the beginning of our flow day, we did a relatively
2 comprehensive inspection of issues we had seen in our production
3 system before, so that we could have those documented on pickups
4 or rejection tags at the beginning of the flow and know what they
5 were when we started our build process.

6 MR. JOHNSON: Okay. So back in September, if there was a
7 discrepancy, how was Spirit notified?

8 MS. LUND: Spirit has a team that works in our factory along
9 with us. They -- a resident team as was mentioned, and led by
10 some Spirit management, and Spirit direct or contract employees.
11 So when Boeing would write these discrepancies, we would then pass
12 them along to Spirit. The pickups, most were on pickups. A few
13 were on rejection tags if something were found that needed to be.
14 Most were on a pickup document.

15 We would pass those findings along to Spirit and then begin
16 the work with Spirit to arrange times to make sure that we have
17 them rectified.

18 MR. ACKERMAN: And may I just add for clarity that that if
19 there was a discrepancy found, it was and is documented on a non
20 -- as a nonconformance in Boeing's system.

21 MS. LUND: Mm-hm. Yes. On the pick up, the NCR pickup that
22 we discussed in our system.

23 MR. JOHNSON: And is that communicated back to Spirit
24 Wichita?

25 MS. LUND: Yes, it is. At the time, September 23rd, we --

1 September of 2023, we had several elements going. We actually had
2 at that time what we called a daily grinder. That's what we
3 called the daily meeting. But every day we would have a call with
4 Boeing Wichita and our production team on the 737 program
5 informing Boeing Wichita of the issues we had seen that day, so
6 that we could quickly get it back into Spirit's process and ensure
7 they were aware of the findings we had every day.

8 MR. JOHNSON: So let's fast forward to current. What steps
9 have you taken to ensure that discrepancies from Spirit are
10 identified and corrected prior to fuselages moving to Boeing?

11 MR. ACKERMAN: I'll take that one. As Mr. Grabon indicated,
12 one of the changes we added to the process, effective March 1st,
13 every fuselage goes through what we call final product
14 verification, which is a dedicated area in Spirit's factory where
15 we have Boeing inspectors.

16 Typically spend a couple of days going over that fuselage
17 front to back, outside and inside, to identify any discrepancies.
18 Those are documented in Spirit's system, reworked by Spirit, and
19 bought back by Boeing inspectors.

20 Just to add a little context to that, as Mr. Grabon described
21 earlier, the delivery of that fuselage from Spirit to Boeing
22 occurs in Wichita. So we actually, we take ownership of that
23 fuselage when it goes on -- when it's on the rail car exiting
24 Spirit's factory. So we want to have that acceptance verification
25 at the location where it's manufactured.

1 MR. JOHNSON: What changes to the process or policies have
2 been implemented since the accident at Boeing? I know it's a
3 broad question. It's -- I'm looking for improvement, so --

4 MS. LUND: Broadly, yes. So broadly, when we started to
5 implement our changes and post accident, we set a -- we set about
6 casting a wide net to get feedback from many, many sources. I
7 briefly referred to it earlier, but we implemented what we called
8 quality stand downs. We had over 70,000 BCA employees go through
9 this quality stand down.

10 This quality stand down was an eight hour full shift, a day
11 and a meeting where we started off with a kickoff, but we then
12 took all cross functional teams. This was engineering,
13 manufacturing, quality, supply chain, professionals, finance, HR,
14 everyone, to the airplane to work in cross functional teams. We
15 taught everyone on the manufacturing floor how we do a compliance
16 walk and a safety walk.

17 We then provided these teams, just for helping and
18 understanding, I'll use an example of a landing gear team. The
19 people who buy the landing gear, design the landing gear, purchase
20 the landing gear, install the landing gear, service the landing
21 gear. All of them come together. We provided them with all of
22 the defects that have been created in their area recently and had
23 that team work on suggestions of how we can improve quality or
24 product safety.

25 We took all of that feedback. We had over 30,000 suggestions

1 come through that activity. We also took all of the feedback from
2 the FAA in the audits that they had come into our factories and
3 conducted. We took feedback from our customers. We took it
4 broadly from a very broad group of people.

5 And then we looked at these areas and at very broad levels,
6 we made changes in four key areas. The first is investing in our
7 training. I talked about some of that earlier in how we've
8 changed our training. We held people in training, we've revamped
9 our curriculum, our closed loop system.

10 And so really significant changes to training that are
11 continuing and ongoing. The next is we've started a process
12 really working on simplification. Simplification of our processes
13 and procedures, as was recommended to us by the FAA, as well as
14 our own employees during our audit out brief. The FAA conducted
15 what they call a special audit item, an SAI. That's the name of
16 the audit they conducted.

17 And as part of the out brief, they recommended a
18 simplification of our processes and procedures. We are
19 undertaking that, and we are also working on simplifying our
20 installation plans, making sure that they are simple, and clear,
21 and easy for our mechanics and our specters to read and access.

22 We then really worked on eliminating defects in a couple of
23 key areas. First and foremost is our supply chain, strengthening
24 our oversight of supply chain with a large part of this being the
25 examples we just gave for things like Spirit. And then also

1 strengthening our compliance systems. Our own compliance,
2 particularly as led by areas where we have recurrent audit
3 findings, internal and external, and that we knew needed to be
4 enhanced.

5 And then lastly is really elevating our safety and quality
6 culture. We took the feedback from the -- 103 legislation. We
7 have started employee engagement teams which we have set aside an
8 hour a week for our teams on the floor with cross functional help
9 to raise their issues, make sure they're getting help with their
10 issues, and that they can work their own issues.

11 And as a part of this, we are also working on how we better
12 manage traveled work. So all of those have begun to be
13 implemented and are in various stages of that.

14 MR. JOHNSON: What specific changes have been made to BPI
15 1581 to simplify it?

16 MS. LUND: I will give you a high level overview. I will
17 also say on tomorrow's panel, my colleague, Mr. Hector Silva will
18 be on the panel representing the quality management system and he
19 will be able to speak in even more detail to this, if you would
20 like to revisit it tomorrow.

21 But at a high level on BPI 1581, since the accident, we've
22 made a few key changes. We initially went and said to start with
23 only leads or team leads would be able to initiate a removal. We
24 have since said, and we said at the time, there's a training
25 program that we put in place.

1 Now any employee who passes the training or assessment
2 program of how BPI 1581 works, and shows they are -- they have a
3 competence and a knowledge, a working knowledge of this BPI can
4 now initiate the removal.

5 So the first change was to -- the very first change was we
6 put out a what we called a read and sign, a summary of the
7 requirements of the BPI, to every employee working in the factory
8 floor, mechanic and inspector. Having them read, reread the
9 requirements of the BPI. And sign that they understood it.

10 We then strengthened the requirements of who could write the
11 BPI. We did that so that we could just say to people, you know,
12 you're going to need to go get your lead or a trained person to
13 write this for you, so that they would reach out, go get someone
14 with that qualification to write the BPI.

15 And then most recently we have also added a quality check
16 that says you are okay to remove, okay to proceed with removal.
17 You got someone who's qualified. They write the removal, and then
18 a quality employee then looks over it and says, yep, you're good.
19 You are okay to proceed with removal. So we have added those
20 additional steps in the BPI since the accident.

21 MR. JOHNSON: Thank you.

22 Mr. Catlin, do you believe that the efforts to change BPI are
23 enough?

24 MR. CATLIN: Well, I would like to point out that in
25 September of 2016, the quality okay to remove was part of the

1 removal process. And in September of 2016, the Boeing Company
2 removed it from the process. And now they've added it back in.

3 BPI 1581, as I said, has grown from -- it has doubled in
4 size, from 28 pages to 58 pages. The majority of the changes to
5 BPI 1581 was to add a complex removal scenario where manufacturing
6 and engineering could be invoked to write a removal with step by
7 step reinstallation processes, which very rarely ever gets used.
8 But the bulk of the changes that has grown 1581 have been reasons
9 why not to write a removal.

10 There's an entire exhibit in the back of the BPI that gives
11 you tons of reasons why you would not need to write a removal.
12 And it really should get back to the simplicity of if it's a
13 previously installed part and you're going to remove it from a
14 commercial airplane, you need to write a removal.

15 MR. JOHNSON: Thank you. Dr. Woods.

16 MS. LUND: Could I just comment, I want to make sure that I
17 did not leave the impression that we are done simplifying BPI
18 1581. I agree with Mr. Catlin that we do need further
19 simplification of that BPI. And so I want to comment that that is
20 part of our ongoing work. And it is by no means, in our opinion,
21 either simple enough or sufficient.

22 MR. JOHNSON: Thank you, Dr. Woods.

23 DR. WOODS: Ms. Lund, you've touched on it in the past,
24 Boeing's comprehensive product safety and quality plan going
25 forward, and you've also touched on briefly the six key

1 performance indicators or target areas in which Boeing is now
2 focusing on going forward. Given the FAA inspections, given your
3 internal audits that have been conducted on your production
4 system, what prevented these same targets from being identified
5 before the accident occurred?

6 MS. LUND: Those six key performance indicators, and I don't
7 know if it would help, I do have an exhibit listing them if that
8 would help for the sake of this conversation. That is Exhibit 6
9 please. Boeing Exhibit 6.

10 MR. CATLIN: Just a point of clarification.

11 MS. LUND: Yes.

12 MR. CATLIN: That's in Boeing's presentation.

13 MS. LUND: Boeing's presentation. Thank you.

14 MR. CATLIN: Not Exhibit 6 to --

15 MS. LUND: Sorry.

16 MR. CATLIN: -- to the public hearing.

17 MS. LUND: Sorry. Thank you. Thank you. Page 6 of the
18 Boeing presentation. I appreciate the help with the language.
19 Okay. The six key performance indicators that we have agreed with
20 the FAA that we will use to watch production health, the number of
21 proficient employees, this will help me answer your specific
22 question, Dr. Woods, very clearly.

23 Number of proficient employees, we, as I mentioned
24 previously, have always looked at staffing as a requirement when
25 we go up in rate. This is similar to staffing, except to say have

1 they passed all proficiency requirements.

2 So have they completed their new structured on the job
3 training, et cetera. So do you have enough of the employees that
4 you need in order to work at the rate. The arrow just basically
5 shows the direction we would like it to go. We would like more
6 proficient employees.

7 The next is supplier shortages. We have always used supplier
8 shortages as an indication of the health of our production system.
9 We think this is representative, it causes disruption in the
10 production system when we have a supplier shortage. So that is
11 one that we agreed with.

12 The next two are really quality related. The first is notice
13 of escapement rework hours. That is rework hours being done in
14 the Boeing production system, typically final assembly, as a
15 result of a notice of escapement. That's an escape that comes
16 from a supplier, either a fabrication internal supplier, or an
17 external supplier. And so that just tells us how much rework are
18 we having to do for notice of escapements into the factory.

19 The next is a total quality measure. How many total rework
20 hours per airplane. We have also looked at this historically.
21 What we have done, what's really new here is setting the control
22 limits, rolling that into our safety management system to
23 understand when we need mitigation activity, when the risk has
24 exceeded, and as we pass one of these control limits.

25 We passed the red control limit. We now run a safety risk

1 assessment and put documented, mitigated plans in place. That's
2 really the change, not the metric itself, but the agreement of the
3 control limits, and the targets, and the action we take.

4 Next is travelers at factory rollout. That is did we get the
5 majority of the work within our control limit completed in the
6 factory. And then lastly is really our output metric at the end
7 of the line. How many defects do we find at the time of
8 ticketing. And with the 737, this is defects found by the FAA at
9 the time of their ticketing activity.

10 So what I will say is these metrics have been in place with
11 small changes to them over time. What has really changed is the
12 control limits, how we work through our safety management system
13 when we pass one of those control limits, as well as the fact that
14 the FAA now has transparent visibility, real time visibility into
15 our system where they can watch these metrics.

16 They update on a daily basis. Where they could watch these
17 metrics real time across our programs. But those are the real
18 changes. It's the agreement of just these six, and the control
19 limits, and how we work with them in our safety management system.

20 DR. WOODS: Thank you. With that, Mr. Brazy, the tech panel
21 concludes its questions.

22 MR. BRAZY: Thank you, Dr. Woods. Madam Chairman.

23 CHAIR HOMENDY: Thank you very much. We're going to move to
24 the parties. I just want, I just want a word of caution here.
25 This isn't a PR campaign for Boeing. What I want to know, what we

1 want to know is what happened in March, April, May, June, July,
2 August, September, leading up to this. Leading up to what
3 happened in January.

4 You can talk all about where you are today. There's going to
5 be plenty of time for that. We want to know these safety
6 improvements. But what is very confusing for a lot of people who
7 are watching, who are listening, is what was going on then. This
8 is an investigation on what happened on January 5. Understand for
9 everybody? Great.

10 We're going to move to the parties. And we are going to
11 start with questions from the Airline Pilots Association. Each
12 party will have 5 minutes to question the witnesses. We'll have
13 multiple rounds as time permits. Parties, please remember, you
14 must limit your questions to the topics listed in the agenda.
15 Please also refrain from asking questions that call for
16 speculation.

17 Finally, remember that only your designated spokesperson may
18 question the witnesses. I'll now turn the floor over to ALPA.

19 CAPT JANGELIS: Thank you, Madam Chair.

20 Our question is for Ms. Lund. Earlier, the Boeing speak up
21 program was mentioned. Two fully trained and qualified pilots and
22 in flight crew, flew this crippled airplane to a successful
23 landing. They filed voluntary ASAP reports, which stands for
24 Aviation Safety Action Program. ASAP reports are confidential and
25 deidentified and generates improvement in safety in the operation.

1 Is speak up similar? And how is it implemented and governed?

2 MS. LUND: Speak up is similar to the ASAP process. Speak up
3 is a confidential system. It is when you log into the speak up
4 system within the Boeing system, there is an option to submit
5 anonymously. And it is always confidential. The way it's
6 administered when the employee writes the speak up, it is assigned
7 to really a function or a program, a part of the organization who
8 would handle it.

9 They do come across confidentially. I will say, I personally
10 read all of them for the safety organization, and I have no access
11 to the employees name who submits them. The investigative team
12 themselves, if they're confidential and came in with a name, would
13 be the team who has access to that so they could go discuss it
14 with the employee.

15 And we track it in our safety management system reviews, we
16 track the completion, the actions, we do it by function, by
17 billboard, and then at program levels. The one other comment I
18 will make related to ASAP, as I understand it, is the elements of
19 ASAP where the unions and the companies and things work together
20 is the element that we were working on when we formed our tri-
21 party agreement last year with the FAA and the IAM to ensure that
22 we were trying to find similarities to that same process of the
23 ASAP with the union representation in the loop, as well as the
24 FAA.

25 CAPT JANGELIS: Thank you. Prior to COVID, manufacturers

1 allowed airline quality control inspectors to observe the build
2 process. Airlines had inspectors stationed in the factories. Has
3 that process been brought back to the quality assurance of the
4 build after COVID? I believe this is both for Boeing and Spirit.

5 MS. LUND: Yes. And we can both take it. I will, I will
6 start by saying we do have airline inspectors in our factory and
7 at our flight line. We actually did have it pre-COVID. We have
8 it today. We have quite a few customers. We have customer
9 inspections throughout our build process where the customers can
10 come and inspect or say good to go themselves, or they can
11 delegate that to the Boeing quality organization. But it is, it
12 is currently in process.

13 CAPT JANGELIS: Okay. Thank you. It's been described during
14 interviews with employees and FAA inspectors that experience
15 levels at Spirit have decreased over the last five years. How is
16 Spirit addressing on the job training for technicians when the
17 majority of the experienced technicians have left or retired.

18 MR. GEORGE: I mentioned that earlier we've expanded this to
19 six to eight weeks training. We are going to do an additional
20 step, similar to this. So another two weeks of specific OJT into
21 the area that they're going to go into. So that they could be
22 more aware of the requirements that the airplane and their, and
23 their requirements.

24 CAPT JANGELIS: Follow up question to that. What training
25 records shows standardization or proficiency from that on the job

1 training you described?

2 MR. GEORGE: I'm not familiar with all of the details through
3 the training group, but I'm sure that it's collected, but I'm just
4 not familiar.

5 CAPT JANGELIS: Thank you.

6 My follow-up is to the IAM. What changes to technician
7 training have been implemented from an IAM viewpoint to mitigate
8 this risk?

9 MR. CATLIN: Well, we've never been impressed with Boeing's
10 training at all and since somewhere around 2008, prior to 2008,
11 there was pre employment training that was required, then there
12 was extensive skills process center training that was required.
13 Now that's all changed.

14 Prior to the January 5th door plug blowout, Boeing's training
15 at their foundational training center was in really bad shape.
16 There has been changes, but I don't know that it's enough.

17 CAPT JANGELIS: Thank you.

18 And my last question is to Ms. Lund. All the extra on the
19 floor training experience discussed earlier sounds pretty
20 positive. IAM discussed the degradation of BPI training from
21 formal training, the bulletins, and now tips. How will Boeing
22 prevent a reduction in these after accident improvements?

23 MS. LUND: Thank you. Sustaining these gains is super
24 important to us. We are documenting much of this in command media
25 to ensure that it is formalized. We are auditing against these

1 improvements with our internal audit team as we make them. First
2 and foremost, we're making the commitments to ourselves and then
3 to the FAA, who are auditing against them to make sure that they
4 maintain.

5 We are watching the metrics, that's why we're working on
6 these closed loop feedback loops. And ultimately we will use our
7 SMS process and our SMS architecture that as we change our
8 processes, we will evaluate the risks from changing those
9 processes. We will run SRM's and SRA's so that we have clear
10 visibility of the risks occurring as we make changes.

11 CAPT JANGELIS: Thank you.

12 CHAIR HOMENDY: Thank you very much. We're going to go with
13 Alaska Airlines.

14 MR. TIDWELL: Thank you, ma'am. As far as the this first
15 panel on the overview of the manufacturing, we did have a series
16 of questions. The technical panel did a very good job of
17 clarifying the things that were on our minds. So no further
18 questions.

19 CHAIR HOMENDY: All right. Thank you very much. We'll go
20 with the Association of Flight Attendants.

21 MR. HEIPLE: Thank you.

22 This question is for Boeing. All 737 exit doors, including
23 mid exit doors, have a door proximity switch that illuminates an
24 indicator light in the flight deck when a door moves even slightly
25 out of its locked position. However, Exhibit 9A indicates this

1 warning system appears to be partially installed, but not used on
2 the 737-Max9 mid exit door, when a door plug is installed.

3 While door plugs are not opened during daily operations, they
4 will be opened many times for maintenance over the fleets
5 lifetime, introducing the possibility of an insecure closure. An
6 operative door proximity switch could provide an additional layer
7 of safety by alerting the pilots to any door plug movement,
8 resulting in subsequent maintenance action.

9 The structured group chairs factual report documents that
10 door plug separation on flight 1282 occurred at only 16,000 feet,
11 where the pressure differential between the inside and the outside
12 of the aircraft was slightly lower than it would have been at
13 cruise altitude.

14 While the aircraft is certified to withstand a sudden
15 decompression at any flight altitude caused by a hole slightly
16 larger than an aircraft window, the hole created by the departure
17 of the door plug was more than twice that size. A door plug
18 failure must be extremely improbable, which the FAA defines as a
19 condition so unlikely that it is not anticipated to occur during
20 the entire operational life of all airplanes of one type, with a
21 probability of less than one in a billion.

22 Alaska Airlines flight 1282 suffered door plug separation
23 just 73 days after aircraft N704AL was manufactured. Is the
24 system also excluded on the 737-900ER's, and -- with door plugs.
25 And considering the potential catastrophic structural failure that

1 could result from a door plug separation at cruise altitude, why
2 was a decision made to exclude this and to any other warning
3 system on mid door plugs?

4 MS. LUND: With the caveat of not being a door design expert,
5 I will tell you to the best of my understanding where we are. So
6 you are correct, we have the door warning sensor and light on
7 doors that notifies in case of a -- that there's movement, or not
8 fully closed. It was not included, as I understand, to the best
9 of my knowledge, on the mid exit door plug, because the plug was
10 intended to be structured, not something that opens and closes.

11 We absolutely agree with the standpoint that it needs to be
12 extremely improbable, that changes need to be made. Upon my
13 conversations with our engineering experts, they are -- they, they
14 have looked at activating the sensor for the plug. They don't
15 think that will work necessarily as we would want. They are
16 making changes to that plug.

17 They are working on some design changes that will allow the
18 door -- the plug to not be closed if there's any issue, until it's
19 firmly secured, that would hold it securely in, as well as simple
20 changes to make sure things like that the fasteners are lanyarded
21 on.

22 So they have done a review assessment of ways to improve it
23 to make sure that we make it so it can't move again, and these are
24 the changes that are in work because they felt that those would be
25 even more secure, and that's what we're proceeding to work on.

1 MR. HEIPLE: So it sounds like you're implementing some
2 physical mitigations, are those going to be retrofitted when
3 they're developed?

4 MS. LUND: Yes, they will.

5 MR. HEIPLE: Do you have a timeline for those mitigations?

6 MS. LUND: I understand it from my discussion with the chief
7 engineer that they have approved the design changes to begin. I
8 don't have a timeframe. Rough estimate I would say within Boeing,
9 I expect them to be implemented, I know this is a very rough
10 estimate, but I'll say within the year.

11 We will then make them available for retrofit in the fleet
12 once the design gets certified in production. Ideally it will be
13 much quicker than that. I just don't have the detailed plans. We
14 don't have the actual design completed so that we can flow it out.

15 MR. HEIPLE: I do have more questions, but it looks like I'm
16 running short of time so I will yield.

17 CHAIR HOMENDY: Thank you very much. Federal Aviation
18 Administration.

19 MR. GERLACH: Thank you, Chair. A few questions.

20 First one to Boeing. Can you explain your delegation of
21 authority to Spirit for changes? What types of changes must be
22 reported to Boeing from Spirit?

23 MR. ACKERMAN: So in our, in our supply chain, there are
24 suppliers that do have design responsibility for product. In this
25 case, structures has design responsibility for the 737 fuselages,

1 or most elements of the 737 fuselages. We have the oversight of
2 that delegation from an engineering perspective.

3 There are requirements for what types of changes would need
4 to be brought to Boeing. So basically a major change versus a
5 minor change. And anything that would fall into that major
6 category or significant category, anything that would require
7 certification changes to the product would have to have to come
8 through Boeing.

9 MR. GERLACH: The next question is for Spirit, regardless of
10 customer demands, if your workers identified significant safety
11 issues, what procedures or processes did you have to hold the line
12 to address the issue? So you can, you can look at it as a did and
13 do, if you will.

14 MR. GRABON: So are we, are we talking strictly through the
15 manufacturing process? So in the manufacturing process, as far as
16 holding the line, if a, if a mechanic or an inspector identify an
17 issue, they can -- you raise your hand. We have an issue. The
18 quality inspector will come over determine what the impact is.

19 Based on what type of defect has been found and what the --
20 what's required in order to correct the defect, we talked tags
21 earlier. A tag would be written, engineering would disposition
22 what needed to -- what needs to take place in order to bring the
23 part back to conforming. At times, the decision will be made that
24 that aircraft can move while we're waiting on things such as parts
25 to come back in, if a special part is required, something like

1 that. There's an order of precedence.

2 The order of precedence dictates whether or not the next job
3 can take place, or whether or not the fuselage can proceed, and
4 then the part can be installed at a later time. As far as
5 additional raising of your hand, Spirit has something that we call
6 Quality 360, which is an anonymous process where anyone, anyone,
7 within, within Spirit, it doesn't have to be an inspector or
8 mechanic, it could be anybody.

9 If they have a concern, regardless of what the concern is,
10 they file that concern and then we have an internal audit team who
11 looks at those concerns. They do an investigation and determine
12 whether or not, well, they determine what to do with the, with the
13 results of the investigation.

14 MR. GERLACH: Thank you.

15 And then for IAM, Lloyd. Was there a high turnover in mid
16 level management at Renton facilities?

17 MR. CATLIN: Yeah, after the two plane crashes and COVID,
18 Renton was empty for a long time, for 20 months. When I was
19 representing our members down in Renton from January of 2023
20 through May of 2023, according to the numbers provided to me by
21 Boeing management, 60 percent of the Boeing workforce, including
22 management, had less than two years with the Boeing Company in the
23 Renton facility.

24 MR. GERLACH: And then Lloyd, also was IAM involved in
25 promotion of workers to quality inspectors.

1 MR. CATLIN: Well, we have a system. It's called the
2 employee transfer, I can't think of it right now. The ERT system,
3 employee requested transfer, which is a system that has been
4 worked into our contract with the Boeing company that would allow
5 somebody to go and take courses that would turn their red lights
6 to green, which would allow them to file an ERT to be able to self
7 promote themselves through the Boeing company.

8 So somebody could go from a manufacturing position to a
9 quality position by accomplishing the courses and then filing the
10 ERT, which would allow them to take that open position. The
11 problem is, is that we have issues in our labor agreement that
12 prevent a lot of our manufacturing people from following through
13 the ERT process, because it would freeze their wages for an
14 additional period of time.

15 And so we are seeing a lot of people filling quality roles
16 from the street rather than internally because of the
17 complications in the ERT system, and basically holding people
18 back.

19 MR. GERLACH: Thank you very much. It looks like I'm out of
20 time.

21 CHAIR HOMENDY: Thank you very much, Mr. Gerlach. Going to
22 IAM.

23 MR. HOLDEN: Thank you, Ms. Chair.

24 I have some questions for Spirit. Has Spirit shifted in
25 process inspections performed by quality inspectors to mechanics

1 to make conformist decisions on the work they perform? For
2 example, inspections for bond and ground, face seal, shimming, or
3 inspection on close tolerance holes.

4 MR. GRABON: No. So quality is responsible for those
5 inspections. So the mechanic has responsibility for their work
6 and the quality of their work. But a mechanic cannot sign off on
7 an electrical bond. That has to be performed by a quality
8 inspector with electrical bond certification.

9 MR. HOLDEN: So in process inspections for close tolerance
10 holes and shimming, those are all performed by inspectors.

11 MR. GRABON: Those are performed by inspectors.

12 MR. HOLDEN: Thank you. Does Spirit use statistically based
13 sampling plans to verify conformance in place of a quality
14 inspection?

15 MR. GRABON: Are you -- I -- if I understand your question,
16 do we use statistics to say this is okay to remove an inspection,
17 is that the path you're on?

18 MR. HOLDEN: Not okay to remove, but you know, a statistical
19 monitoring system, process monitoring instead of a, you know,
20 second set of eyes to look at the operation or the final work of
21 the operation.

22 MR. GRABON: Spirit will look at quantity of defects found or
23 escapes throughout the line. So for instance, if a -- if there's
24 a repeat escape, something that's found outside of position, we
25 will add, where we can, we have the ability to add an inspection

1 back in the location where the work is to be performed.

2 In addition to that, if that work were to move or it would
3 travel for any reason at all, we have a quality alert notification
4 system. It's called a QAN. That in MES system, in order for the
5 job to be completed and to proceed on, that job has to be checked
6 through the MES system. Does that --

7 MR. GEORGE: Let me add to it. We have not replaced
8 inspection with SPC.

9 MR. HOLDEN: Thank you.

10 MR. GERLACH: This question is for Ms. Lund at Boeing. We
11 had lots of discussion about BPI 1581. In fact, that's just one
12 BPI, there are many on how to build the aircraft. BPI 1581
13 defines the removal process. There are BPI's that define when
14 rework invalidates previous okay to install inspections, and many
15 others.

16 So what has been done since the accident by Boeing to ensure
17 comprehension and training of mechanics and QA within Boeing, or
18 contractors from Spirit to comply with BPI's each time BPI's have
19 been revised?

20 MS. LUND: We -- I previously commented on our current system
21 of alerting mechanics of BPI changes. We are working on improving
22 that. We don't have that fully implemented. When it comes to
23 Spirit mechanics, we have implemented an assessment process that
24 when a Spirit mechanic comes to work in a Boeing factory, we put
25 them through the same assessment. We put a structures mechanic, a

1 Boeing structures mechanic, through before they can go work on the
2 floor.

3 So we do now a Boeing hands on assessment of that mechanic,
4 including following the processes to ensure that they can pass
5 that same level prior to going to work on the floor. We have put
6 out quality alerts or tip sheets, depending on the location for
7 issues that we have found issues with since that time. But that
8 is how we are updating and keeping our employees updated and
9 working to improve that process.

10 MR. GERLACH: Thank you.

11 This question is for Mr. Catlin. It's more of a situational
12 question around how something might be installed and inspections.
13 So when insulation blankets are installed over existing structure
14 with an okay to install inspection, what does that inspection
15 accomplish?

16 MR. CATLIN: Well, if we use an 8789 airplane, the okay to
17 install installation plan lists everything that the mechanics, the
18 quality inspector, and the customer coordinator, or life customer,
19 whichever it is, is looking for and they're looking for loose or
20 missing parts. They're looking for open holes, loose or missing
21 fasteners, damaged fasteners, FOD. Missing CIC, chip scratches,
22 nicks, dings.

23 They're looking for everything in that closure area which on
24 that IP was set -- was Station 727 to 887 from Stringer 17 all the
25 way across the top of the crown to the floor on the other side.

1 So it's an extensive inspection that covers a large area.

2 MR. GERLACH: What happens if there is a need to perform
3 rework, like on the five rivets behind the already installed and
4 stamped complete blankets?

5 MR. CATLIN: So if the blankets had been installed and there
6 was rework that needed to be performed in the closure area per
7 BPI2573, which is performed conformance, decisions or something.
8 Section 4.2 or 4.3 would require the invalidation of the okay to
9 close. It would require the stamps be removed, and that okay to
10 close be reperformed by manufacturing quality and the customer.

11 MR. GERLACH: And BPI titled apply authority media and common
12 manufacturing execution system, or CMES, as it states, when
13 disassembly of work is necessary, remove shop authority media
14 before inspection. Would this require QA to remove the stamps
15 associated with the okay to install insulation blankets?

16 MR. CATLIN: Correct. Yes it would.

17 MR. GERLACH: Would that have driven, once the rework is
18 complete, would that have driven another okay to install
19 inspection on the blankets before it covered the structure,
20 including the MED plug?

21 MR. CATLIN: Yes, it would. It would have, it would have
22 caused for the okay to install in that area to be reperformed,
23 which would have caused manufacturing to go in, verify everything
24 that they had on the previous okay to install, which would have
25 been loose or missing fasteners, open holes, missing safety and

1 devices.

2 It would have then caused line quality to reinspect the
3 entire area, including the MED plug. And then it would have
4 caused customer coordination to perform another inspection. So it
5 would put three sets of eyes on that door plug prior to that, with
6 that blanket going back in.

7 MR. GERLACH: Thank you. No further questions.

8 CHAIR HOMENDY: Thank you very much. And we'll go to Spirit.

9 MS. MEYER: Thank you, Chair.

10 Mr. Grabon, so with some of the changes in the workforce that
11 we've had and some of the challenges, can you maybe speak to some
12 of the investment that Spirit's made and the automation and
13 incorporation into both production and inspection processes?

14 MR. GRABON: So there's been a significant investment.
15 There's -- we look at things, what can we automate in the
16 manufacturing world, and what can we use to help our inspectors
17 inspect. In the video that you saw earlier, we have tools such as
18 SPIFI. SPIFI is a -- it measures fastener head heights, although
19 not -- it doesn't cover the entire fuselage, but it does cover
20 section 41, which is our -- which is the nose of the aircraft,
21 which is where complex contour, it's very difficult to measure
22 sometimes.

23 SPIFI is, I believe, installed on ten out of the 14 locations
24 right now. In addition -- excuse me, in addition, we have
25 something called an eight tree scanner. An eight tree scanner

1 looks at a -- at an area about eight and a half by 12. In that,
2 it gives you basically a topo map of whether it's a skin
3 depression or fastener installation. And you can -- it looks to a
4 thousandth of an inch or so.

5 On the manufacturing side, automation. You saw a lot of our
6 auto fastening equipment that we're using. We utilize that type
7 of equipment to help improve the product and that's been, that's
8 been going on long before, before this incident. I'm trying to
9 think if there is any other things that we've done. I think that
10 -- I think that's it.

11 MS. MEYER: Can you also maybe talk, Mr. Grabon, to the
12 initiative that Spirit took on in, in January of 2023, and then
13 kicked off mid year that year, having understood the challenges
14 with the newer mechanics, and the different workforce, with the
15 employee proficiency process, that now is campus wide?

16 MR. GRABON: So Spirit looks at, if there's training in place
17 that -- what we do is we test our employees. So for each one of
18 the training programs, you can -- they'll take a, they'll take a
19 pretest, they'll take a posttest, to determine how efficient they
20 are.

21 We then take an entire list of the mechanics matrix --
22 through a matrix looking at different skill codes. And we check
23 off on our rating, I believe it's one through four, the
24 proficiency rating of those mechanics. So the idea and the
25 concept behind it is looking at the proficiency of the mechanic,

1 and you put the right mechanic in the right place.

2 The build is unique in that some areas don't -- do not
3 require a long-term, highly, highly skilled seasoned mechanic,
4 where other ones do. So when you look at things like lap joins
5 that you saw in the video, laps and loops, a lot of hand driven
6 fasteners. Those are typically are more experienced mechanics.
7 The ones will have a higher proficiency ratings.

8 And then we installed things like workplace coaches.
9 Workplace coaches then help bring people up to speed and help them
10 understand the build, help them see where there are deficiencies,
11 and then improve on it. Does that answer your question,
12 Ms. Meyer?

13 MS. MEYER: Yeah. Can you talk to what we still have left to
14 do, maybe with that process to get the right person in the right
15 job?

16 MR. GRABON: Yeah. So it's, yeah. I don't, I don't want --
17 we're not there yet. So a lot of talk about the skill sets and
18 the skill set being different post-COVID, and that's very true.
19 We do have a long way to go.

20 What we are trying to do is ensure that when people are in
21 that position, or in a position, can we keep them in that
22 position. Turnover causes us to move some, some people around,
23 and it's the same with inspectors. The idea is, can you become
24 proficient in an area, and if you can become proficient in area,
25 that means your quality will get better over time.

1 And when your quality gets better, and the quality inspectors
2 are all looking at the same thing, everybody starts seeing the
3 same thing and then it becomes more routine. The idea will be as
4 time moves on, we'll become where we were just a few years back,
5 where a single mechanic can do multiple jobs across the factory.

6 MS. MEYER: And then real quick, if you could just talk to
7 how important it is to get the feedback loop from our customers
8 and the customers customer, a little bit on that QAN process
9 quickly so that we can -- that we had in process before as well.

10 MR. GRABON: Yeah. So I think it's important to note that
11 we've talked about the final product verification process, and
12 that was all post the incident. Beforehand, I think that Ms. Lund
13 or Mr. Ackerman spoke about the grinder meeting. There is --
14 there has always been a return loop between Spirit and Boeing with
15 any defects found in the Northwest.

16 So yes, they'll -- they will talk to the Boeing on site or
17 the Spirit on site team up at Boeing, but then that information is
18 sent back technically through our SQIS system. SQIS is a Supplier
19 Quality Information System. Those defects are then tracked, and
20 they're looked at.

21 Boeing now with the addition of some of their inspections,
22 they are looking for things that -- Boeing Renton talks to Boeing
23 Wichita very well right now. We're also in that loop, but the
24 idea is to put two sets of eyes on the product. Boeing runs green
25 lines, Boeing looks at skin depressions. All those things that

1 they're seeing in Renton are now being inspected in Wichita and
2 looked at with multiple sets of eyes.

3 MS. MEYER: Thank you. Thank you, Madam Chair.

4 CHAIR HOMENDY: Thank you very much. Back to Captain
5 Jangelis.

6 CAPT JANGELIS: Thank you, Madam Chair.

7 This is for Mr. Catlin. Does the IAM have confidence in the
8 speak up program as defined by Boeing?

9 MR. CATLIN: It is in its early phases. It needs help. We,
10 at this point, no, we do not have confidence.

11 CAPT JANGELIS: No further questions. Thank you.

12 CHAIR HOMENDY: Thank you very much. Alaska.

13 MR. TIDWELL: No further questions. Thank you.

14 CHAIR HOMENDY: All right. AFA.

15 MR. HEIPLE: Yes.

16 I have a follow up for Ms. Lund. Can you share a little more
17 information as I'm not an expert on the mid exit, about who made
18 the design decision not to have a backup or redundancy where that
19 door has a single point of failure essentially?

20 MS. LUND: I don't think that I can provide the answer on who
21 made that decision. I wasn't part of the design team, but I could
22 certainly find the answer to that and get it back to the committee
23 or the panel or you, if that would help.

24 MR. HEIPLE: I'd like that. Thank you.

25 MS. LUND: Thank you.

1 MR. HEIPLE: And then also for Ms. Lund. When you had
2 required reading for things like changes to the BPI prior to 2017,
3 where employees reading them during paid time?

4 MS. LUND: The required reading program, and I'll defer to
5 Mr. Catlin, I think he said it was actually as far back as 2008 or
6 '09, or 2000 something early that it was removed. But yes. Back
7 in that day, and I was involved back then as well, it was. The
8 required reading was put out on paid time.

9 MR. HEIPLE: Can you help us understand why that decision was
10 made to remove the required reads and how do you then invalidate
11 that -- or validate that employees understand the changes like
12 those made to the BPI's, and ensure that the change is performed
13 as expected, the work is then performed as expected?

14 MS. LUND: I apologize, but I don't have the background on
15 why it was removed. I was not in a role anywhere near that at the
16 time, so I apologize. I don't have the background on why. In the
17 past, I think we have prior to our recent activities in the past,
18 we have really counted on our audit activities, our oversight
19 activities, and things like that to ensure that our employees were
20 proficient.

21 We would roll out the information. We would communicate when
22 there were issues. We would redo training. We did have our
23 training on various parts that would come out on an ongoing basis.
24 But we need to strengthen that communication.

25 MR. HEIPLE: So if I understand correctly, employees don't

1 have a designated time while they're at work to absorb that
2 information and learn the new information at this time.

3 MS. LUND: I will say we do work with the BPI's and the data
4 with our quality inspectors. We do have times where we review
5 some of this information with our quality inspectors. With our
6 manufacturing teammates, I am not aware of a time set aside where
7 they can really discuss things like that.

8 MR. HEIPLE: And then also for you, but a different question.
9 You've provided a lot of information about your safety actions
10 that you have been implemented -- or that you've implemented since
11 the accident. You've been implementing SMS over the last few
12 years. What part of your SMS would have been responsible for
13 identifying the types of gaps that led to the accident?

14 MS. LUND: I think when I think about the SRM's we have in
15 place today, one is on traveled work. I think the fact that the
16 defect rework traveled through the factory is an element that we
17 now have a safety risk management for and a plan for. So there is
18 one element of the SMS that I think would have helped.

19 I think the supplier oversight, particularly the supplier
20 oversight elements of issues that we saw on a recurring basis,
21 using the data, the data analytics elements of the safety
22 management system to proactively trigger an SRM, and make sure
23 that we had -- we're working proactively on some of these
24 recurring traveled work things, so I think that would be another
25 element of the safety management system that would have helped.

1 And then lastly I think the fact that our removal program,
2 that part did work in 2023. Prior to the accident, we added
3 several speak ups on the removal process, and we had started some
4 activity on the removal process. We had started an SRM on the
5 removal process. We simply did not get the elements implemented
6 prior to the accident.

7 MR. HEIPLE: And if I may, you've mentioned SRA's, safety
8 risk assessments, quite a bit and that you're performing a lot
9 more of them. I was curious about the trigger for an SRA for
10 times when out of work is -- out of order work is completed. And
11 then also, are frontline employees, via their IAM representatives,
12 included in the SRA process as a stakeholder?

13 MS. LUND: It's triggered on traveled work. We have an
14 element -- we have elements of this traveled work process that,
15 that -- and again, to answer your direct question, that was
16 implemented after the accident. This was not in place prior to
17 the accident.

18 But that lists the critical jobs, and we do a safety risk
19 assessment if anything is impacting those critical jobs. But then
20 again on the total quantity, IAM employees are part of assessing,
21 and they complete the statement of work in the next position,
22 safely from both personal product and safety product. It's a
23 cross functional team of engineering and our IAM represented
24 employees who make this assessment that it is okay to move some
25 statement of work. So they are involved at the floor level.

1 MR. HEIPLE: Thank you.

2 CHAIR HOMENDY: Thank you.

3 Mr. Gerlach.

4 MR. GERLACH: Thank you, Madam Chair.

5 Couple questions again for Boeing. What is the quality
6 inspector's role in the build process? Not now, but back when the
7 airplane was being built.

8 MS. LUND: I think at a, at a high level, the answer is
9 somewhat the same. And the answer is the quality inspector's role
10 is to, once a mechanic completes their job and stamps it as
11 complete, typically afterwards, the quality inspector comes behind
12 and validates that that work was completed per drawing and per
13 process, and is compliant, and then they stamp it.

14 At times it may require they do a live witness of the job
15 being completed. But typically they come after the job is
16 complete and validate that the part of the airplane is now
17 conforming and stamp that.

18 MR. GERLACH: And there's, in the paper for installing,
19 removing, and reinstalling that plug, there's quality stamps for
20 that as well.

21 MS. LUND: On September of 2023, when a removal was written,
22 a quality inspector must stamp off the closure of the removal.
23 That has always been in place. So what was not required then was
24 the requirement for quality to stamp off before it's removed to
25 make sure the paperwork is correct.

1 But it was always in place that before a removal or when a
2 removal was complete and it was reinstalled, that a quality
3 inspector would validate that the job had been reinstalled
4 correctly.

5 MR. GERLACH: And then you talked a little bit about safety
6 risk assessments. Does Boeing perform a safety risk assessment
7 when a BPI has changed? Did they back then, and do they now? And
8 then just kind of follow up. How do you decide when to perform a
9 safety risk assessment?

10 MS. LUND: To answer your question, on every BPI back then,
11 no. In September of last year, we were growing in our SRM, and we
12 were evaluating those that we thought caused or posed a higher
13 risk. As we are now expanding it now, we are looking at
14 broadening it to virtually all kinds of changes like that, to take
15 a look. It was not all changes a year ago. That's where we are
16 moving toward right now.

17 MR. GERLACH: Thank you.

18 And then for Mr. Catlin. Is IAM involved in safety risk
19 assessments as well.

20 MR. CATLIN: No, we have no role in them.

21 MR. GERLACH: And that's all the questions I have, Chair.

22 CHAIR HOMENDY: Thank you very much. We will move to IAM.

23 MR. HOLDEN: Thank you.

24 This question is for Mr. Catlin. Boeing referenced that
25 manufacturing isn't getting work time to review BPI changes. But

1 that QA is. So Mr. Catlin, is Boeing providing adequate time and
2 resources for QA to become familiar with BPI revisions?

3 MR. CATLIN: So in my experience and the members that I
4 represent, there -- since they've done away with required reading,
5 there is no time set aside. For our manufacturing personnel, they
6 have a set amount of time before they have to be clocked into a
7 job after they clock into work.

8 And then they're on a bar and those bars are not accurate.
9 They will say that this job is going to take two hours. It could
10 take -- it actually takes four. The bars that are manufacturing
11 personnel work to are not fair. They're not accurate. And there
12 is no time set aside to do required reading or to -- for anybody
13 to focus on what changes are being made.

14 They're not receiving a weekly notification of what BPI's
15 pros or policies have been changed that affect their job skills,
16 or their skill code. So I have no knowledge of any time set aside
17 for our IAM members to study BPI changes.

18 MR. HOLDEN: Are quality alerts that were referenced since
19 required reading is no longer required, are quality alerts enough,
20 are they detailed enough to describe all changes to revised BPI's?

21 MR. CATLIN: Well, the big problem is that with required
22 reading, you had an acknowledgement button that you had to select
23 after you were done going through all the changes and reviewing
24 what changes had happened to the BPI. I reviewed three quality
25 alerts that were released last year that affected BPI 1581. I

1 think it was 055, 056, and 057.

2 None of them have acknowledgement controls on them to show
3 who's read them, who it is that has received them, or who it is
4 that has rostered training that they have received them and
5 understand them.

6 MR. HOLDEN: Thank you.

7 CHAIR HOMENDY: Thank you very much. Spirit.

8 MS. MEYER: No questions, Madam Chair.

9 CHAIR HOMENDY: All right. Well, we still have some time for
10 your panel, so let's just see do -- does ALPA have further
11 questions? And I just want to say, Ms. Lund, Mr. Ackerman, thank
12 you very much. I know you're purposely now trying to
13 differentiate what time period.

14 And just to clarify it is very important to us to determine
15 changes that you've made and process improvements and throughout
16 over this period of time. I didn't want to -- I didn't want
17 anyone to misunderstand that. It's just a little blurry, so this
18 clarification of time period is actually extremely helpful. So
19 thank you very much. ALPA.

20 CAPT JANGELIS: We're good, Madam Chair. Thank you.

21 CHAIR HOMENDY: Good. Mr. Tidwell.

22 MR. TIDWELL: No questions.

23 CHAIR HOMENDY: No questions. All right. And AFA.

24 MR. HEIPLE: Yes.

25 I noticed a difference in the responses about the SRA's

1 between Mr. Catlin and Ms. Lund as far as whether or not they're
2 -- the IAM's included in those and that you're getting the
3 frontline perspective.

4 MS. LUND: What I will offer, I am interested in Mr. Catlin's
5 perspective in this. As I mentioned, these are the changes that
6 we have implemented. We've rolled them out flow day one through
7 seven, on the 737 program. And we've -- the 787 program has four
8 build positions. We have rolled them out in the first two build
9 positions of the 787.

10 We intend to roll them out through all of our factories. But
11 as Mr. Catlin mentioned, he is in Everett. We have not yet
12 implemented this on our 67 and 77 programs in Everett. That may
13 be why he has not seen it. This is a project that we have rolled
14 out since the accident, in conjunction with the FAA and it is
15 still being deployed. So that might also result to that floor
16 level SRA. I will defer to Mr. Catlin to comment on that.

17 MR. CATLIN: I can't speak to what has happened in Renton
18 since January 5th. So I don't know what they're doing down there.
19 That's -- we have two other representatives that represent -- or
20 three other representatives that handle the Everett factory. I
21 don't know about Renton.

22 MR. HEIPLE: Thank you.

23 And this is a rather broad question for Mr. Catlin. Did IAM
24 observe any safety gaps in the manufacturing process that you felt
25 needed to be corrected prior to the accident? And then can you

1 provide some examples of what steps did IAM or your members take
2 to get those addressed, and what was the outcome?

3 MR. CATLIN: Well, that's a big question.

4 MR. HEIPLE: Yes.

5 MR. CATLIN: Yeah. So there's some major issues that the IAM
6 has had over the last several years. So in January of 2019,
7 Boeing implemented their quality transformation plan. Between the
8 two Max crashes, they decided that they wanted to implement
9 something they named verification optimization, where they went
10 through and removed tens of thousands of inspections off of
11 airplanes throughout their production cycles.

12 We know that they removed approximately 3,200 inspections off
13 of the 737-Max line between 2017 and 2019. They removed 7,800
14 inspections off the 777X, they removed tens of thousands of
15 inspections off of functional tests, 6,600 close tolerance hole
16 inspections off of the 767, 777 programs. Not to include -- not
17 even including the okay to close, okay to install.

18 I mean there was tens of thousands of inspections. I was
19 selected to represent the IAM as a verification optimization
20 representative in Everett. We had extensive debates with the
21 Boeing Company, and we were told thank you, but we're going to do
22 it anyway.

23 So we were forced to turn to the FAA and begin filing hotline
24 reports with the FAA, which ended up driving a very large
25 enforcement investigation record that was issued on May 18th of

1 2021. After that, there were still several hotline reports that I
2 was continuing to file.

3 The FAA asked me to begin using speak up because my hotline
4 reports were consuming a large amount of time and it was -- speak
5 up was new, so I agreed, and I began filing speak up reports which
6 were immediately being closed. So I turned around and filed
7 hotline reports, and they were substantiated by the FAA and that's
8 what drove the that tri-party agreement.

9 So yeah, we've had extensive issues with safety and quality
10 at the Boeing company going back to 2014, 2016. Three FAA
11 compliance findings issued in November of 2017, stating you can't
12 replace quality inspections with manufacturing verifications only
13 to have them roll out a new BPI6631, where they removed tens of
14 thousands of inspections and replaced them with manufacturing
15 verifications.

16 MR. HEIPLE: A quick follow up for Ms. Lund. Have those
17 inspections been put back, or are there plans to put them back?

18 MS. LUND: We now have more inspections per airplane on a 737
19 then at certainly anytime within the last ten plus years. When we
20 look at average number of inspections per airplane. So I will say
21 we have added in a lot of inspections. We are continuing to add
22 in inspections.

23 For complete clarity to your questions, when we say were all
24 inspections put back in, verification optimization was originally
25 designed to remove inspections where there was going to be another

1 inspection looking at the same thing right after it. Nothing was
2 going to be closed. You'd be able to see. Or we had inspections
3 for things that happened off the airplane.

4 We did remove some off the airplane inspections that are not
5 related to the build of the airplane, that we have not necessarily
6 reinstated. But in terms of in stating inspections on the
7 airplane, we inspect more items on every airplane today than we
8 have previously. And so, yes, they are back in, and we are
9 continuing to add.

10 MR. HEIPLE: Do we want to follow up, Mr. Catlin or are we
11 out of time?

12 CHAIR HOMENDY: We -- you are out of time. Is it one follow
13 up?

14 MR. HEIPLE: No. I just want to know if he has a response
15 to --

16 CHAIR HOMENDY: Oh.

17 MR. HEIPLE: -- Ms. Lund's statement.

18 CHAIR HOMENDY: Go ahead.

19 MR. CATLIN: Yeah, I don't, I don't agree with anything of
20 Ms. Lund's perception of what verification optimization was.
21 6,600. close tolerance hole inspections. There -- once you
22 install the fastener, there is no, there is no reinspecting that.
23 Removal of shim inspections, carte blanche across all
24 programs. Every shim of four thousandths or greater does not get
25 inspected to this day, on the majority of our airplane programs.

1 Those you cannot inspect after the fasteners have been installed.
2 If they're face sealed, once those fasteners installed and they're
3 pulled up, there's no reinspecting that.

4 Functional test inspections. They were removed off of the
5 just in time tests, and the installation plans in the thousands on
6 every airplane program. Once you've passed that -- and all of
7 this was rejected by the FAA in EIR 2021 NM 420001, encounter
8 conditions four through seven, assigning conformance decisions,
9 assigning manufacturing to manufacturing, is not acceptable to the
10 FAA. And so we, we have a very different perspective of
11 verification optimization.

12 CHAIR HOMENDY: Speaking of the FAA, Mr. Gerlach, you're up.

13 MR. GERLACH: Thank you, Chair.

14 With regard to those inspections that you've added or moved
15 to a different place, do you still have quality inspectors there
16 doing those tasks?

17 MS. LUND: Yes, we do. And we've added inspectors as well.
18 We have more inspectors on the 737 program than we have in
19 history, as well. And we have twice as many as what we had in
20 2017 at a high rate today.

21 MR. GERLACH: And so what you're saying is there's a pretty
22 significant change from back when this aircraft was manufactured
23 to where we are today?

24 MS. LUND: Correct.

25 MR. GERLACH: And then with the -- over to Spirit. Did

1 Spirit have a voluntary reporting system prior to this event? Do
2 you have one now?

3 MR. GRABON: Yes. The quality 360 was a voluntary reporting
4 program. I don't know exactly when it started, but it was prior
5 to the accident.

6 MR. GERLACH: Thank you very much. Madam Chair, those are
7 all the questions that we have.

8 CHAIR HOMENDY: Great. Machinists.

9 MR. HOLDEN: No further questions. Thank you.

10 CHAIR HOMENDY: Spirit.

11 MS. MEYER: No further questions.

12 CHAIR HOMENDY: All right. I just wanted to make sure
13 because you do have ten more minutes. ALPA, any questions?

14 CAPT JANGELIS: No, Madam Chair.

15 CHAIR HOMENDY: Alaska.

16 MR. TIDWELL: Nope.

17 CHAIR HOMENDY: AFA.

18 MR. HEIPLE: No further questions.

19 CHAIR HOMENDY: All right. FAA.

20 MR. GERLACH: No further questions. Thank you.

21 CHAIR HOMENDY: IAM.

22 MR. HOLDEN: No.

23 CHAIR HOMENDY: Spirit.

24 MS. MEYER: No further questions.

25 CHAIR HOMENDY: Great. All right. So I want to be cognizant

1 of the fact it is so difficult to be a witness at a hearing. So I
2 want to -- do -- would you like a break? Anybody want a break for
3 about ten minutes? Do you want to keep going? You're okay. Do
4 you need more water? I see water running out up here. Okay. We
5 have chocolate going up here. So if you if you want some, that's
6 okay.

7 All right. So we are going to move to the Board of Inquiry,
8 and you know, I think we're pretty all familiar with how this
9 goes. So I don't need to go, go on. We have, you know, we have
10 till 2:00, but we can keep going. And then of course we can go
11 back to the technical panel, back to the parties, and then back to
12 us at any point,

13 I'm going to yield myself five minutes to ask questions. I
14 just want to clarify. Mr. Johnson did a great job on -- and I
15 want to go back a little bit just so I make sure I understand on
16 the inspections.

17 So Spirit, let's start with Mr. George or Mr. Grabon, whoever
18 wants to take this. In 2023, spring and summer, what inspections
19 of a fuselage occurred? I know you said there are inline
20 inspections. There's some final inspections, and inspections
21 before it goes on to a train to Renton. But could you, could you
22 go through what inspections were occurring there and then you
23 could also add what changed then yeah.

24 MR. GRABON: Back at that time frame, Spirit performs in
25 process inspections where the quality inspector throughout the

1 build. There's reference to the close diameter holes. There's,
2 throughout that, throughout that build, there are locations where
3 specific inspections need to occur.

4 And that usually occurs whether it's a close tolerance hole,
5 or it's going to be covered by other structure. It's the
6 validation that the build up to that point has been proceeding the
7 way it should. That includes some engineering defined shims,
8 structural shims.

9 There are inspections that require the measurement of the
10 gap, the measurement of the shim, prior to the installation
11 because it can be face surface sealed over, and you would no
12 longer be able to see that. So those in process inspections
13 always took place.

14 Final inspections are when the IP is put up for sale to be
15 completed, what that usually means is there is in process
16 inspections throughout that process, and then the final is
17 validating that the job in its totality has now been completed.

18 Usually you can, you can -- there'll be more inspection
19 points at the final inspection just because it's going to look at
20 the job as a whole. So those all took place. We did have --
21 there's a lot of communication about quality alert notifications.
22 Quality alert notifications did exist prior to the door incident.

23 Quality alert notification, prior to that, we had something
24 that we called a playbook process where a quality inspector would
25 look for very specific things. Usually, they would have been an

1 escape to Boeing, or would be considered to say a green line, a
2 repetitive escape, that would be anything that had already
3 progressed to a certain point. That would then be inspected at
4 the end of the line prior to the unit being shipped.

5 Then we also had FOD inspections. The FOD inspections took
6 place before the accident as well.

7 CHAIR HOMENDY: And at what point do you -- is -- does the
8 rigging of the mid exit door plug occur?

9 MR. GRABON: The mid exit door plug rigging the -- it's --
10 the pre-rig process occurs at the end of the line. Post accident,
11 we determined that our planning did not match the process as far
12 as the location. The procedure itself was the same. The location
13 where it happened in the factory was not. The planning was then
14 adjusted to ensure that the mid exit door, it's pre-rigged in the
15 integration location.

16 However, it has to remain open due to our camo process. It
17 is then closed at the end of the line, and that's where the
18 arrestor bolts were installed.

19 CHAIR HOMENDY: Okay. And so in that process where you do
20 pre-rigging and at some point you close it, at the end, are you
21 checking for any sort of hardware, at that time, in '23? Were you
22 checking for any sort of hardware around the door plug that may
23 have been missing or not installed? How was -- how did that
24 happen?

25 MR. GRABON: So if it was -- if the structure around, well,

1 the structure throughout the fuselage, it's either -- it comes
2 from suppliers, or it's built within Spirit. Any structure that
3 was built up through the IP process through the Boeing -- or
4 through the, sorry, through the Spirit build process, that's where
5 the in process and the final inspections will occur.

6 So that was all looked at. If a part was received from a
7 supplier with designated inspection authority, you don't reinspect
8 that part. However, if a let's say a defect or what looks to be a
9 defect or a nonconformance is identified by either a mechanic or a
10 quality inspector, they can go look at that defect, determine
11 whether it's acceptable or not acceptable.

12 If it's acceptable, there's no paperwork written, there's no
13 -- we don't record conforming product. If it is found to be a
14 nonconformance, we would write up paperwork, whether it's a pickup
15 or an engineering type tag requiring engineering disposition.

16 CHAIR HOMENDY: Thank you. I have more questions on this but
17 Member Grant.

18 MEMBER GRAHAM: Thank you, Chair.

19 I'm going to start with Spirit and let's go back before the
20 fuselage. Let's talk about the edge frame. Is that manufactured
21 by you or a supplier?

22 MR. GRABON: That is a supplier.

23 MEMBER GRAHAM: Okay. How do you accept that edge frame?
24 And I want to say back at the time of the accident.

25 MR. GRABON: Yeah. So the edge frame is -- that supplier has

1 inspection authorization, meaning that they have the ability to
2 buy off on the, on the installations of the entire, the entire
3 build of the frame. When Spirit receives it, we will, because
4 they're a delegated company, we will -- we install the frame. We
5 do not necessarily perform another reinspection of the frame.

6 However, if a defect is noted, it can be, again, written up
7 and reworked at Spirit, or in some cases we can bring the supplier
8 in to perform the rework.

9 MEMBER GRAHAM: Okay. So back then, you didn't inspect it at
10 all as an acceptance, but if you saw a nonconformity, you could
11 write it up or do something about it.

12 MR. GRABON: Yeah. If a nonconformance is found, we write it
13 up and we can rework it, or we can have the supplier rework it.
14 But we do not necessarily reinspect everything that is provided to
15 us.

16 MEMBER GRAHAM: Okay. Has that acceptance process changed at
17 all since the accident?

18 MR. GRABON: No. The inspection process hasn't changed.
19 There has been, regarding the door frame in particular, we do have
20 additional inspection points put around the installation of the
21 mid exit door.

22 MEMBER GRAHAM: Okay. Very good. Thank you.

23 Let's talk about the fuselages that you build for Boeing.
24 You basically have two different fuselages that you make for
25 Boeing. Is that correct? On the 737 line.

1 MR. GEORGE: No, actually we have five or six minor models.

2 MEMBER GRAHAM: Okay. Okay. So you have the Max 8 and the
3 Max 9. Correct?

4 MR. GEORGE: Yeah. We have a freighter, and we have a
5 business jet.

6 MEMBER GRAHAM: Okay.

7 MR. GEORGE: The platforms are --

8 MR. MATTHEWS: Okay. So you assemble the six independent
9 sections of the fuselage at an integration station, I believe you
10 said.

11 MR. GEORGE: Correct.

12 MEMBER GRAHAM: Okay. Do you have to have different jigs for
13 the different size 737's?

14 MR. GEORGE: No. When you saw in the picture with the system
15 that we have is, we call AIT. It's mobile. It moves with the
16 length of the airplane, and it has targets on it, and it's all
17 automated.

18 MEMBER GRAHAM: So it knows the different size fuselage.

19 MR. GEORGE: Yes.

20 MEMBER GRAHAM: Okay. Do the employees know the different
21 types of fuselages that are coming?

22 MR. GEORGE: Yes and no. Meaning, they -- in great detail,
23 do they know that they're coming? No.

24 MEMBER GRAHAM: No.

25 MR. GEORGE: But we have a firing order and the whole team

1 has a good look ahead on it.

2 MEMBER GRAHAM: Okay. So there's the different size
3 fuselages coming at you with -- and I -- it would be fair to say
4 with a Max 9 that two additional door frames are going to be on
5 that airplane.

6 MR. GEORGE: Yes. So that particular ACC or control station
7 that installs those, they're very much aware that those are coming
8 down the line.

9 MEMBER GRAHAM: Okay. So these can go on any one of the ten
10 integration stations. Correct?

11 MR. GEORGE: Yes.

12 MEMBER GRAHAM: So are the employees trained on how to build
13 each different fuselage?

14 MR. GEORGE: Yes. Yes, they are.

15 MEMBER GRAHAM: Okay.

16 MR. GEORGE: The planning paper directs them on each one of
17 those.

18 MEMBER GRAHAM: Has anything changed as far as training goes
19 with the Max 9 door frames or anything since the accident?

20 MR. GEORGE: Yeah. There's been, again, we've gone through
21 the process of as designed, as planned, as built, which is we've
22 gone through the entire thing in terms of sequence and location
23 like Scott talked about earlier, relative to the door.'

24 On the door frame, I don't, I don't think we've changed
25 anything relative to the build or the inspection.

1 MEMBER GRAHAM: Okay. The -- I'll ask that in the next
2 panel.

3 I'm going to go over to Boeing right now. Let me ask you
4 about, you had talked about the flow day one, two, and three. And
5 does a 900 go down a different line or can they go down any one of
6 the three lines?

7 MS. LUND: They go down anyone of the three lines, all of our
8 minor models.

9 MEMBER GRAHAM: Then the same question is every employee
10 trained on the differences and what they look at differently or
11 perform work on --

12 MS. LUND: Yes.

13 MEMBER GRAHAM: -- on each model?

14 MS. LUND: Yes.

15 MEMBER GRAHAM: Has any training for that changed since the
16 accident?

17 MS. LUND: As I referred to our overall training, that has
18 changed. Our specific minor model training has not, per say. But
19 our overall training has changed significantly since then.

20 MEMBER GRAHAM: Okay, great. Thank you. My time is up.

21 CHAIR HOMENDY: Thank you. Member Chapman.

22 MEMBER CHAPMAN: Thank you, Chair.

23 Ms. Lund, you shared the diagram of your production lines,
24 and you made reference to the term flow day, which I assume is not
25 literally a 24 hour day. I assume that's sort of synonymous with

1 the workstation or something like that. Is that correct?

2 MS. LUND: When our factory is -- it's capable of moving at a
3 one day pace. When they originally named it many years ago, when
4 we made the 737-NG, that's because we lay out our daily work
5 statement such that it could be completed in one day, and then it
6 moves to the next day, and the next day. That said, we frequently
7 hold it in a position more than one day.

8 MEMBER CHAPMAN: Thank you. And you indicated that the door
9 plug would be checked initially at flow days one, two, and three.
10 And then there would be a final check, I believe you said it's
11 flow day nine. How detailed would those checks be? And would
12 they include specifically checking to ensure that the bolts needed
13 to ensure that the plug is held in place, are present and properly
14 secured?

15 MS. LUND: Those checks are intended to check for rigging.
16 In flow day one through three, we check both the inside and the
17 outside. We make sure that the gaps are right, that there's no
18 protrusions, that that that we check it in general.

19 I don't know if it calls out, per se, check for the bolts,
20 but I believe the bolts would be checked and noted in flow day one
21 through three when you look at the inside and the outside to check
22 that area. On flow day nine, that is an external check only.

23 MEMBER CHAPMAN: Okay.

24 MS. LUND: That is to make sure once the airplane puts its
25 weight on wheels, nothing has shifted, and that it's still flush

1 and rigged correctly on the outside. So it would not check it
2 flow day nine.

3 MEMBER CHAPMAN: Okay. So a little bit of an open question,
4 but it sounds like at the early stage, there would, there would
5 have been or should be a check for the bolts.

6 MS. LUND: Correct.

7 MEMBER CHAPMAN: For my understanding and maybe for others as
8 well, three systems that have been mentioned, or at least are
9 mentioned in some of the documents. I believe you referred to it
10 as CMES, the common manufacturing execution system, the Shiplside
11 Action Tracker, and then there's a term line side control center.
12 Can you please describe the relationship of those three systems
13 and the extent to which documents would be captured in any or all
14 of them.

15 MS. LUND: Sure. The vast majority of the documents will be
16 captured in in CMES. That again is our system of record. That is
17 where our installation plans are. That is the system that our
18 employees log into, stamp their job in. That is the system you
19 can use to access the drawings and the specifications. That is
20 CMES. That is our system of record.

21 SAT is a communication system. That is the system that we
22 use when somebody on the floor needs help. Mr. Catlin gave a
23 great example. There was a plan that needed revision. So you put
24 it in SAT. You ask someone to come and help you get this revision
25 that you need.

1 The last one is the line side control center. That is a
2 group of employees that sits in a table kind of like the one you
3 were sitting at, beside a build position in the factory with cross
4 functional representation there, that is there with some people on
5 the floor who could help the people on the floor real time if
6 something comes up.

7 And so the line side control center is sort of a group of
8 people. The SAT is the system that we use to communicate when we
9 need help, but the system of record that our documentation and our
10 sign off something on will be CMES.

11 MEMBER CHAPMAN: Thank you. Now, if there were going to be a
12 removal, something would trigger required documentation, I assume,
13 and that documentation would be captured in CMES. Is that right?

14 MS. LUND: That is correct.

15 MEMBER CHAPMAN: Could it also be reflected somehow in the
16 SAT system, or might at least the fact that there's going to be a
17 removal, would that be reflected in SAT?

18 MS. LUND: It could be referenced in SAT as the need for a
19 removal or whatever, but the document itself would be housed in
20 CMES. And that's the system it resides in.

21 MEMBER CHAPMAN: And Madam Chair, I have some additional
22 questions. I'm just going to hold until the next round. Thank
23 you.

24 CHAIR HOMENDY: Sure. Member Brown.

25 MEMBER BROWN: Thank you.

1 This probably goes to Boeing. There are clearly a lot of
2 steps in building a 737 Max airplane. Can you say again how many
3 different facilities are involved?

4 MS. LUND: Our 737 Max's are all built in our Renton,
5 Washington facility. There, there are a few different areas of
6 it, as you can imagine, within our Renton site, our wings
7 building, our final assembly building, but they are all located in
8 Renton, Washington.

9 And then they can deliver out of one of two locations.
10 They're built there. They roll out, they get ready to fly, and
11 then they can fly to one of two locations to deliver. One is the
12 Seattle Delivery Center, just a few miles away from Renton in the
13 Puget Sound.

14 The other is our Everett Delivery Center, which is just a few
15 more miles north in the Puget Sound. But they're all -- the
16 Boeing build is in Renton, and then the supply chain network is
17 Spirit and as Mr. Ackerman mentioned, the suppliers that we get
18 our parts from.

19 MEMBER BROWN: How many employees are in the production line
20 where the -- where this aircraft was assembled, both at Spirit and
21 when the fuselage arrived in Boeing's Renton, Washington facility?

22 MS. LUND: In terms of, I'll call them production employees,
23 manufacturing and quality employees involved in the Renton floor,
24 I believe there are around 7,500 or 8,000 production employees in
25 the Renton facility.

1 MEMBER BROWN: Okay.

2 MR. GEORGE: I'm going to round it to 2,000 on the 737
3 fuselage.

4 MEMBER BROWN: Okay. Can you talk a little bit about Boeing
5 subcontractors in this process, and who are they, and how they're
6 selected?

7 MS. LUND: Mr. Ackerman.

8 MR. ACKERMAN: So for clarification on subcontractors, are
9 you referring to when we have suppliers, employees, or suppliers
10 contractors in our production system doing warranty work?

11 MEMBER BROWN: Correct.

12 MR. ACKERMAN: I'll start by saying that there's fairly
13 limited examples of where we do that. Spirit is one doing
14 structural warranty work, and we identified a defect that was as a
15 result of Spirit build, we will have -- we have a number of
16 employees that are essentially resident in in Renton.

17 Spirit manages those employees. We oversee that work, and we
18 will stamp that work. There are a couple of other areas where we
19 have similar arrangements where we have suppliers doing warranty
20 work, but I would say Spirit is the largest.

21 MEMBER BROWN: Can you -- what is that number? In terms of
22 overseeing -- oversight for those employees, do you have a number
23 of managers, because between Boeing and Spirit, you work very
24 closely together. Correct?

25 MR. ACKERMAN: I -- we do. I don't know the total number we

1 have in Renton off the top of my head, but I would say in total
2 Spirit and all other companies combined would be less than 100.

3 MEMBER BROWN: Was there any impact following the divestment,
4 divestment of Spirit AeroSystems in 2005 on the inspection,
5 transparency, and communication process between the two companies
6 during manufacturing. This is in 2005, so that merger divestment.

7 MR. ACKERMAN: Yeah. I would say -- I don't have -- I was
8 not involved or working in anything relevant to 737 production in
9 2005. So I would not be able to talk to changes over that time
10 period.

11 MEMBER BROWN: Okay. What governs your quality control
12 inspection procedures with Boeing subcontractors then?

13 MR. ACKERMAN: What governs our overall inspection
14 procedures?

15 MEMBER BROWN: Mm-hm.

16 MR. ACKERMAN: We have, similar to what Mr. Grabon described,
17 we have many of our suppliers that are delegated. That's where
18 they are delegated to do inspection on our behalf. We monitor
19 that through the audits we do on site. We do -- we monitor that
20 through product audits or production system audits.

21 We oversee that by looking at the data and we can make
22 changes to that, and often do remove that delegation or put
23 additional -- or put inspectors at a supplier to do that
24 inspection at the source.

25 MEMBER BROWN: One other question. How do you determine the

1 proficiency of the people reviewing and managing that risk
2 assessment?

3 MR. ACKERMAN: The auditors that Boeing employees to have at
4 our suppliers? We do training of our supplier quality
5 representatives. We, you know, we look at the results of the
6 outcomes of that, we look at the results of the audits relative to
7 the defects we're seeing. So we have a continuous employee
8 proficiency monitoring program.

9 MEMBER BROWN: Thank you. No further questions.

10 CHAIR HOMENDY: Thank you. Member Inman.

11 MEMBER INMAN: Thank you.

12 Ms. Lund, I want to go back to something and I'm trying to
13 figure out if I caught it the right way or not. But you discussed
14 that you had ramped up some inspections, that you had decreased
15 some inspections off site for audits.

16 MS. LUND: My comment was during the verification
17 optimization off the plane. So for example, if you needed to set
18 up a stand off site --

19 MEMBER INMAN: Okay.

20 MS. LUND: -- off the plane. I'm sorry not off site, off the
21 plane. That is not necessarily a stamp anymore. I do want to be
22 clear that the inspections on the airplane are higher.

23 MEMBER INMAN: I understand. What about outside of the --
24 after delivery. Has that changed in any way? Do you still stamp
25 after delivery?

1 MS. LUND: The way our process works, and if I don't answer
2 your question, please help me. The way our process works is we
3 stamp the airplane in our production certificate up until we
4 ticket the airplane. After we ticket it and deliver it, if we
5 still need to do work on the airplane, we do that under our repair
6 station ticket, much like an airline would do it under their
7 repair station ticket. So it changes from our PC 700 build once
8 an airplane delivers, to a repair station at that time.

9 MEMBER INMAN: Okay. Because the troubling thing I think
10 that came out in the documentation is in regard to removals, since
11 April 23 of 2018, there were 62 instances of a door plug being
12 removed. MED plug. But 24 of them were while they were initiated
13 while the airplane was in Renton. But 38 of them on 13 different
14 airplanes were initiated in field locations after the factory
15 rollout.

16 Preflight delivery center storage sites. My question is, are
17 we going to solve for a different problem later on because we're
18 fixing things in the production line, but I don't know if we're
19 fixing them after they get past your door.

20 MS. LUND: Thank you for the clarification. In all of those
21 locations, the delivery center, the storage site, and the
22 preflight, the rollout, the post rollout, they are all under PC-
23 700, and all covered by these same processes and the things we're
24 talking about fixing. All of those are covered by those same
25 processes, the same stamps, et cetera.

1 MEMBER INMAN: Would they be integrated on the same, I guess,
2 through the same review, your quality reviews?

3 MS. LUND: Correct.

4 MEMBER INMAN: Okay. Thank you. It was also noted
5 immediately after the crash, and I want to point out Alaska was
6 one of the, I think, one of the first of our 121 operators to
7 start a safety management system. They sent someone directly to
8 the plant, an auditor. What were the results of that or what were
9 found?

10 MS. LUND: I cannot speak to the results of the audit from
11 the Alaska audit in our production system, per se. I can't speak
12 to that off the top of my head.

13 MEMBER INMAN: Was your team involved with that?

14 MS. LUND: We absolutely are. We work closely with Alaska
15 Airlines.

16 MEMBER INMAN: Did they make suggestions?

17 MS. LUND: Alaska Airlines has made many suggestions.
18 Absolutely.

19 MEMBER INMAN: But do you know what they are?

20 MS. LUND: Yes. Their chief auditor has been to visit us
21 many times. I've personally met with her. I met with her at
22 Alaska. I've, I've met with Max at Alaska. I've met with them
23 back at our site. We are implementing them. We've taken those
24 feedback and we work with her and give her updates on all of the
25 improvements that we've made across the board.

1 I think maybe where I'm hung up as I wasn't quite referring
2 to that as the exact results of their audit. And maybe that's the
3 word, but I'm working closely with Brooke and with Max and Alaska
4 on following up on all of those commitments.

5 MEMBER INMAN: Okay. Were you the site manager or the plant
6 manager during the time of that audit?

7 MS. LUND: I was not.

8 MEMBER INMAN: Who was?

9 MS. LUND: The program manager of the 737 and the vice
10 president general manager was Ed Clark (phonetic).

11 MEMBER INMAN: And he is no longer with Boeing.

12 MS. LUND: That is correct.

13 MEMBER INMAN: Okay. I just noticed because he isn't in any
14 of our interviews, so I don't know if he was made available or
15 not. We'll move on to -- I'll come back to that probably in a
16 little bit, if it's okay, Chair.

17 A couple of just easy questions for right now. Has the door
18 always been -- the plugs always been made in Malaysia?

19 MR. GRABON: Yes.

20 MEMBER INMAN: Why?

21 MR. GRABON: It's part of the Spirit supply chain. We have,
22 we have parts manufactured all around the world.

23 MEMBER INMAN: And how --

24 MR. GRABON: They have they have capability of building the
25 door.

1 MEMBER INMAN: Do you have capability in Wichita building a
2 door?

3 MR. GRABON: We would -- we could, Spirit manufacturers, we
4 build many parts. We could essentially build probably every
5 single component that goes into a 737, but it's limited by space
6 and capacity.

7 MEMBER INMAN: Okay. I'll waive till my next round.

8 CHAIR HOMENDY: Thank you.

9 I want to go back to my questions on the inspections you
10 mentioned and the process inspections you mentioned, end of line
11 inspections, inspections of tasks, going back to 2023. And let me
12 just cut to the chase here on what I'm asking.

13 After this occurred, Boeing worked with FAA to develop a MOM.
14 There were inspections of door plugs on other aircraft. There
15 were identified incorrect number of washers installed at various
16 locations, clearance and gaps that were out of limits, loose
17 fasteners at various locations, incorrect fastener grip length,
18 missing cotter pins, and minor damage to components.

19 So my question is in 2023, what was in place at Spirit to
20 catch that before the fuselage went to Boeing?

21 MR. GRABON: In 2023, the work instructions, with the work
22 instructions and the in process inspection were in place. The
23 details of some of the things that were identified, such as let's
24 say a shanked fastener, where it wasn't all the way seated. That
25 should have been caught in that there are requirements that you're

1 checking fastener head height.

2 Those are there and those, if those were missed, then it's an
3 escape from Spirit. But there was independent of the MOM
4 inspection that you referred here, the MOM came after the incident
5 where additional inspections were -- an additional layer or
6 several layers of inspections were put in place.

7 CHAIR HOMENDY: Understood. I'm just trying to understand,
8 was it a problem with the documents or the instructions? Or it
9 was just missed in some cases. Were the instructions clear that
10 hardware had to be in place, that it needed to meet certain
11 specifications?

12 MR. GRABON: I would, I would say it's a combination of both.
13 There was a lot of clarity added to the inspections to look at
14 very specific locations, as opposed to looking at the job in its
15 -- as it's -- in totality. So I would say it's a combination of
16 missed inspections by the, by the inspector, as well as
17 clarification, additional clarification was needed through the
18 inspection process.

19 CHAIR HOMENDY: Okay, great. Thank you. And so what is in
20 place now to address that?

21 MR. GRABON: The inspections are very detailed now in regards
22 to the MOM inspection that added the additional inspections, those
23 are now incorporated into the Spirit inspection process.

24 CHAIR HOMENDY: Were all of --

25 MR. GRABON: So there's validation steps.

1 CHAIR HOMENDY: Okay.

2 MR. GRABON: Yeah, there's validation steps throughout the
3 installation and the pre-rig, and the, and the final closure of
4 the door. Everything that was found through the MOM process that
5 was needed to be added into the inspection process is now
6 documented at Spirit.

7 CHAIR HOMENDY: And Boeing, is there now to ensure the
8 adequacy of the inspections before it leaves to go to Renton.
9 Correct? But was not before.

10 MR. ACKERMAN: That is correct. Specifically for the mid
11 exit door, all configurations, plug in door configurations, Boeing
12 does an additional inspection into -- on top of what Mr. Grabon
13 just shared.

14 CHAIR HOMENDY: And I'm curious. What sort of process, you
15 know, you mentioned the mid exit door plug, but there are
16 discrepancies and defects in other areas. What exists outside of
17 the door plug to ensure those defects escapes nonconformance,
18 whatever you want to call it, don't occur before they leave
19 Spirit?

20 MR. ACKERMAN: We now do as of March 1st, 2024, a full
21 inspection, a Boeing inspection. We do it in conjunction with
22 Spirit inspectors, but there is a full Boeing inspection over a
23 couple of day period at the very end of the production system.
24 After the fuselage comes out of their factory, it goes back into a
25 different area of the factory where we do that inspection.

1 Any discrepancies are documented in Spirit's quality
2 management system, resolved, and then re inspected by Boeing.

3 CHAIR HOMENDY: In Wichita.

4 MR. ACKERMAN: In Wichita.

5 CHAIR HOMENDY: So I'm going to ask both Spirit and Boeing,
6 what's your confidence in, you know, percent confidence in this
7 that in a fuselage leaving, going to Renton without these types of
8 hardware missing or loose hardware, or other sorts of defects?
9 What's your confidence in what you're receiving, Boeing?

10 MR. ACKERMAN: We have seen as a result, as we've put these
11 inspections in place, we have seen significant improvements and
12 that reflects in significant improvements in rework hours that we
13 have in our Renton factory. So we are seeing a very positive
14 effect of having those inspections in place --

15 CHAIR HOMENDY: But would you say --

16 MR. ACKERMAN: -- and they will remain in.

17 CHAIR HOMENDY: -- 100 confidence, no problems, we're not
18 worried.

19 MR. ACKERMAN: We're always going to strive to make sure we
20 have a very robust system and any risk that we see in that system,
21 we will take immediate action to address.

22 CHAIR HOMENDY: Spirit.

23 MR. GRABON: I think if -- so the inspection process is a
24 manual process. It's a -- there's a human element to it. No
25 matter how many defects Spirit and Boeing find in Wichita, there

1 will be a number that make it to Renton. That's just a, it's a
2 statement of fact. That's the way the metrics look.

3 On average about maybe nine percent. The defects are not --
4 or they're, I'm going to say, you can never call a defect minimal.
5 However, the defects that are being found now in Renton are not
6 significant structural defects. They're still -- we're looking at
7 mainly fastener head height, maybe sealant, things like that. But
8 whenever there's a human inspecting an airplane or anything else,
9 there is going to be a level that you're not going to get 100
10 percent a perfect airplane out the door.

11 CHAIR HOMENDY: Thank you very much. Appreciate that.
12 Member Graham.

13 MEMBER GRAHAM: Thank you, chair.

14 I'd like to go to Boeing. Let's go back pre-accident. You
15 talked about the acceptance of the fuselages when they show up at
16 Renton. And they are inspected either on flow day one or flow day
17 zero as you put it at the time. Who would inspect those?

18 MS. LUND: The Boeing quality inspection team.

19 MEMBER GRAHAM: How many people are we talking about?

20 MS. LUND: I don't have the exact number, but I'm going to
21 guess ten --

22 MEMBER GRAHAM: Okay.

23 MS. LUND: -- approximately.

24 MEMBER GRAHAM: Several people --

25 MS. LUND: Yes.

1 MEMBER GRAHAM: Okay.

2 MS. LUND: Yes.

3 MEMBER GRAHAM: Okay. And any nonconformance or defect that
4 is conforming would be, I assume, documented at that point?

5 MS. LUND: Correct.

6 MEMBER GRAHAM: Yeah. And those defects that are, we don't
7 call them ugly, we call them cosmetics. I worked for a
8 manufacturer before.

9 MS. LUND: Yes.

10 MEMBER GRAHAM: Okay.

11 MS. LUND: Yes.

12 MEMBER GRAHAM: Okay. So any nonconformance at that point
13 would be documented. Correct?

14 MS. LUND: Correct.

15 MEMBER GRAHAM: Usually an NCR and then an NCO written on top
16 of that most likely for the work to be done.

17 MS. LUND: That's correct.

18 MEMBER GRAHAM: And if it's all work that's on that fuselage
19 that came from Spirit, you would have Spirit work on all of those
20 nonconformances. Is that correct?

21 MS. LUND: By and large, that's correct. Yes.

22 MEMBER GRAHAM: Okay. So we have a nonconformance that needs
23 to be worked on and it's determined that to get to that work, a
24 medium exit door needs to be removed. So a removal then needs to
25 be written. Is that correct?

1 MS. LUND: Correct.

2 MEMBER GRAHAM: Okay. And what form does that go on?

3 MS. LUND: That goes on a removal form which is housed in
4 CMES.

5 MEMBER GRAHAM: Okay. So you got a removal form. And who
6 would write that removal back then?

7 MS. LUND: In September of 2023, any employee could write a
8 removal form.

9 MEMBER GRAHAM: Any, okay. And then that's put into the
10 system. Correct?

11 MS. LUND: Correct.

12 MEMBER GRAHAM: Okay. In the case of work being redone or
13 being worked, it'd say Spirit had to do the work. Then a Spirit
14 employee or a contractor of Spirit would stamp off their work and
15 ask for a Spirit inspector to buy that work off. Is that correct?

16 MS. LUND: In 2023.

17 MEMBER GRAHAM: Yes.

18 MS. LUND: The process was such that a Spirit mechanic would
19 stamp their work. They would ask for a Spirit inspector to stamp
20 their work, and then a Boeing inspector would come along behind it
21 and stamp the work.

22 MEMBER GRAHAM: Okay. And then stamp their work. At any
23 point prior to this, would the Spirit mechanic know that there was
24 a removal written? And maybe that's for Spirit.

25 MS. LUND: Probably so.

1 MR. GRABON: Can you, can you repeat that --

2 MEMBER GRAHAM: Yeah.

3 MR. GRABON: -- question?

4 MEMBER GRAHAM: Yeah. So if there is a nonconformance where
5 a removal, like the door, has to be removed so they could -- they
6 repair rivets, right.

7 MR. GRABON: Mm-hm.

8 MEMBER GRAHAM: Would that employee, that mechanic that goes
9 and does the rivet work in this case, know that they actually see
10 a removal?

11 MR. GRABON: Yes. Spirit cannot perform any work until the
12 paperwork is in place authorizing spirit to touch the airplane.

13 MEMBER GRAHAM: And that would include a removal of the door.

14 MR. GRABON: The paperwork supporting the removal, whatever
15 the removal supports.

16 MEMBER GRAHAM: Okay.

17 MS. LUND: I might just ask, and this will probably be
18 discussed in the next panel. Typically in my experience and we'll
19 discuss it in the next panel as well. Spirit comes and says I
20 need access.

21 MEMBER GRAHAM: Okay.

22 MS. LUND: And when they need access for -- they are not
23 allowed to open and close things or things like that, so they come
24 and ask for excess -- access, and then the Boeing employees figure
25 out what access they need. Do you need to open a door, do we need

1 to remove the plug, whatever the answer may be. But they're
2 typical ask is for the access, not for the paperwork on our side
3 required for it.

4 MEMBER GRAHAM: Okay. Okay. Fair enough. And then when it
5 is time for a reinstall, I assume a Boeing inspector would give a
6 okay to install. I mean, is that correct and to reinstall the
7 door?

8 MS. LUND: In terms of the removal paperwork today, that was
9 one of the changes since the accident. At the time of September
10 2023, a Boeing instructor -- a Boeing inspector would inspect the
11 final installation and put the final stamp on a removal. So when
12 a removal had happened, it had been reinstalled, the inspector
13 would come and give the final stamp. Since that time, we now have
14 the inspector do the okay to remove up front, and the stamp at the
15 end.

16 MEMBER GRAHAM: Okay. So it has changed. All right. Thank
17 you. I see my time's up. Thank you.

18 MS. LUND: Thank you.

19 CHAIR HOMENDY: I actually went over so -- okay. Member
20 Chapman.

21 MEMBER CHAPMAN: Thank you, Chair. First of all, thank you
22 to all of you. I've learned a lot today and this has been very
23 helpful. We appreciate your patience and your time. I just have
24 a few additional questions.

25 Member Graham actually covered a lot of what I had intended

1 to ask about it, so I just -- I'm sorry to go over this again. I
2 just want to make sure I understand this correctly. So prior to
3 the accident, any employee on the line was authorized to initiate
4 removal and to generate the removal documentation. Correct?

5 MS. LUND: Correct.

6 MEMBER CHAPMAN: And that documentation would have gone into
7 CMES, it would have been captured in CMES. Right?

8 MS. LUND: Correct.

9 MEMBER CHAPMAN: And is there -- was there then and is there
10 now a way for anyone to remove a document from CMES?

11 MS. LUND: Because CMES is the system of record, once, I will
12 use this term, a job is fired, a job is loaded in the system, it's
13 become active. A job cannot be removed from CMES.

14 MEMBER CHAPMAN: Okay.

15 MS. LUND: If it's in the planning upfront before it's become
16 active, it's something that's planned for a week from now, but it
17 hasn't become active, that can be adjusted. Once it becomes
18 active, it's fired, it's an order on the floor. It cannot be
19 removed.

20 MEMBER CHAPMAN: Okay. And prior to it -- so once it's
21 active, it cannot be removed.

22 MS. LUND: Correct.

23 MEMBER CHAPMAN: Prior to becoming active, if it were
24 removed, would it leave some sort of signature --

25 MS. LUND: Trail.

1 MEMBER CHAPMAN: -- or some sort of footprint?

2 MS. LUND: Yes, I believe it would.

3 MEMBER CHAPMAN: Okay.

4 And if I could just ask the folks from Spirit, what are your
5 processes? Who at Spirit would be authorized to initiate a
6 removal and to generate the documentation? Does it differ from
7 Boeing's process before and after?

8 MR. GRABON: Manufacturing initiates the removal process.

9 MEMBER CHAPMAN: Okay. When -- I know that there are 20 plus
10 Spirit employees at the Renton factory, I believe. Is that
11 correct?

12 CHAIR HOMENDY: Member Chapman, can I just clarify? Was your
13 question for Mr. Grabon, was that at the Renton factory or
14 Wichita?

15 MEMBER CHAPMAN: In Wichita.

16 CHAIR HOMENDY: Okay.

17 MEMBER CHAPMAN: What the process in Wichita?

18 CHAIR HOMENDY: Thank you.

19 MR. GRABON: Yeah. What I referred to is Wichita. Spirit
20 does not write removals at the Boeing facility in Renton.

21 MEMBER CHAPMAN: And how about at the Wichita facility?

22 MR. GRABON: Yeah. In in Wichita operations, Spirit
23 operations initiates the removal process.

24 MEMBER CHAPMAN: And I assume you have a system that's
25 analogous to CMES. Is that right?

1 MR. GRABON: Yeah. Yes, we have the MES system,
2 manufacturing --I just lost my train of thought.

3 MEMBER CHAPMAN: That's all right.

4 MR. GRABON: Execution system. Manufacturing Execution
5 System. It's the same. It is a mirror image of Boeing as we work
6 with Boeing, a lot of their systems are similar to ours.

7 MEMBER CHAPMAN: Okay. Thank you. And thank you for
8 catching that. Yes, I appreciate that.

9 So one last question here. Where inspections are performed,
10 again, we're back to Renton now, where inspections are performed,
11 it's my understanding there are 20 plus Spirit employees at
12 Renton. To what extent are inspections done or required to be
13 done by Boeing inspectors versus Spirit inspectors, or a
14 combination of the two?

15 MS. LUND: I'll take it for now. Boeing inspectors, as I
16 mentioned, did and do the initial inspection of the fuselage when
17 it arrives. As I mentioned before in September, the Spirit
18 employee, when they did rework, would do their rework and stamp
19 it. Their inspector would stamp it. Our inspector would stamp it
20 behind it.

21 Since the accident, Spirit's quality no longer stamps their
22 work, their manufacturing stamps their work, and now a Boeing
23 quality is the final stamp to ensure that the rework is
24 conforming.

25 MEMBER CHAPMAN: Thank you.

1 Is that square, Spirit, with your understanding of the
2 process?

3 MR. GRABON: I believe that's correct.

4 MEMBER CHAPMAN: Thank you. Thank you, Chair.

5 CHAIR HOMENDY: Thank you. Member Brown.

6 MEMBER BROWN: Just for just clarification for me, based on
7 -- and this is for Boeing and Spirit. Based on what you said
8 earlier about some of the steps in building an airplane, can you
9 talk about sort of the risk assessment Boeing plays when the
10 fuselage arrived in Renton, Washington? Just tell me about that
11 process and the risk assessment before.

12 MS. LUND: So to ensure I understand your question, are you
13 asking about sort of the way we think about risk of the fuselage
14 coming in --

15 MEMBER BROWN: Yes, before.

16 MS. LUND: -- and what things -- before?

17 MEMBER BROWN: In '23, yeah.

18 MS. LUND: So the way we would think about risk is the first
19 level of risk would be mitigated through our supplier oversight
20 program. We have had people on Spirit, on site at Spirit for a
21 while. But that risk is exactly why we were doing those
22 inspections. We were taking a process for anything that we had
23 seen as a defect in our build and checking for it. Even though we
24 were working every day to get it back to Spirit, we were working
25 with them. We were feeding it back.

1 But that's not an instantaneous process and that wasn't
2 foolproof. So as a layer of mitigation and protection, we were
3 doing that full inspection at Boeing to ensure that things we had
4 found previously were looked for to make sure that they didn't
5 exist again. And if they were, that we would get them documented
6 and fixed.

7 MR. ACKERMAN: And if I may add to that, I mentioned earlier
8 in my testimony about the escalation we started in May of 2023,
9 when we framed that, the things that we chose to drive Boeing
10 inspections into Spirit's factory were around product level
11 safety, sensitive structure, aft pressure dome, vertical thin
12 fitting. We looked at, across the build, where are there critical
13 structural elements or manufacturing processes that when you're
14 complete with assembly, would make a defect hard to detect.

15 And those are the areas. So it was that product safety
16 approach that we used to determine what areas we were going to put
17 inspections in Spirit's factory back in May of 2023.

18 MEMBER BROWN: Okay. And where are you now?

19 MR. ACKERMAN: We continue those. There are some where we
20 went through a process of inspecting, in some cases 30, in some
21 cases 50 airplanes. We did not find any defects over the course
22 of that inspection regime. So in some cases we've stopped those
23 inspections, and we've replaced them with different inspections.

24 And then, as I said, as of March 1st, 2024, we added a full
25 tip to tail inspection. But those in process inspections

1 remained. Including the, including the mid exit door.

2 MS. LUND: And at Boeing, we have taken that inspection we
3 used to do at Boeing, moved it back to Spirit with our employees
4 at Spirit to make sure that the defects are fixed prior to
5 shipment.

6 In addition, from a risk safety standpoint, and this goes,
7 this goes beyond the fuselage and beyond Spirit, but I think it's
8 important. Post accident, our engineering team did an assessment
9 and picked several systems that are critical to safety. They were
10 systems such as things that could cause a rapid decompression, a
11 major structural failure, flight control systems.

12 And we have added inspections at the end of the manufacturing
13 process, most between our first flight and our delivery process
14 where we would do an intermediate inspection anyway, in addition
15 to the mid exit door inspections where we are going in and
16 inspecting these critical systems as that final set of eyes to
17 make sure that nothing is missing.

18 Longer term, we're doing complete design build assessments of
19 all of those, as Terry mentioned, that's where you take the
20 design, the build, the planning, the inspection you make sure
21 there's no latent defects, there's nothing that's not there. And
22 then you come up with mistake proofing, design changes. That's
23 part of the design changes I was mentioning on the plug itself
24 that we will be adding.

25 We're doing that across all of our critical systems,

1 systematically, as part of our future improvements as well.

2 MEMBER BROWN: Thank you.

3 CHAIR HOMENDY: All right. Member Inman.

4 MEMBER INMAN: Thank you.

5 We were talking earlier about the number of employees in
6 Washington for Spirit. And I just want to clarify, you said that
7 there were 20 employees. Is that correct?

8 MS. LUND: Twenty, I said roughly ten, it could be a little
9 more or less involved in the initial inspection of the fuselage.

10 MEMBER INMAN: Sorry, I was speaking to Spirit.

11 MS. LUND: Oh. I'm sorry. I'm sorry.

12 MEMBER INMAN: It's okay if you want to add some more.

13 MR. GEORGE: It's between 20 and 30, generally. It -- and
14 from there it can go down, it can go up.

15 MEMBER INMAN: Okay. And you, you call those employees? How
16 many of them are actually on Spirit's payroll at the time of the
17 accident? Or the production, excuse me?

18 MR. GEORGE: I would say at the time of the accident, they
19 were all contract employees, and they are today.

20 MEMBER INMAN: Every single person that represents Spirit.

21 MR. GEORGE: Yes, but prior to that, we've had a mix. So it
22 hasn't always been that way. We've had a mix of direct and
23 contractors, let's say back in '21, '20.

24 MEMBER INMAN: Pre-COVID.

25 MR. GEORGE: Yes.

1 MEMBER INMAN: Why is there, I guess it's just an obvious
2 question. Why are there no actual Spirit employees in Washington,
3 managing all of these contractors.

4 MR. GEORGE: There's a lot of talent in Seattle relative to
5 contracting. They're very highly skilled. They're very mobile.
6 They're easy to obtain and easy to release when we need to.
7 That's the biggest reason.

8 MR. GRABON: I think we do need to add that the person
9 overseeing all the contractors as a Spirit direct employee.

10 MEMBER INMAN: So there is someone there. I thought from the
11 group factual report, the overall manager, that one is an
12 employee.

13 MR. GRABON: There is, and you'll meet him on panel two.

14 MEMBER INMAN: He's sitting at the witness table, I think.

15 MR. GRABON: Yeah.

16 MEMBER INMAN: He's happy he's still got the job, I believe.

17 MR. GRABON: You'll see him on panel two.

18 MEMBER INMAN: Okay.

19 MR. BRAZY: Madam, Madam Chair. I have two -- sorry for the
20 interruption. I have two -- one request for a break and we're
21 actually slipping into the next panel. So we could defer some of
22 this line of questioning to the next panel, perhaps.

23 CHAIR HOMENDY: No. We're going to continue to go. We can
24 take a break real quick for -- we'll do ten minutes after Member
25 Inman is done with his line of questioning. But we're going to

1 continue as long as this panel has -- we have questions for this
2 panel. I mean, we've only been going 40 minutes and with all due
3 respect to the staff, you had two hours. Okay.

4 MEMBER INMAN: Thank you.

5 CHAIR HOMENDY: Thank you.

6 MEMBER INMAN: I don't want the staff mad at me. Can we take
7 the ten minute break?

8 CHAIR HOMENDY: We can take the ten minute break right now.
9 We'll go to 1:50. I just want to be clear that our job does not
10 end at NTSB, and we have a Chair's call at some point for a fatal
11 highway crash that we're going to have to break for. So we'll
12 just keep an eye on that. But we will come back at 1:50.

13 (Off the record)

14 (On the record)

15 CHAIR HOMENDY: I think, I think -- okay. The former chair,
16 you know, it was always about promptness. So we're -- he's, you
17 know, I'm -- he's taught me that. So I'm now -- and now I'm in
18 that. So we're going to go ahead and start. I know we have
19 Mr. Catlin coming -- oh, here we go. So let's keep going. I know
20 that Member Inman had some additional questions. We'll just start
21 his five minutes over again. Go for it.

22 MEMBER INMAN: Thank you.

23 So we noticed in that, and this is coming from the, I guess,
24 the operational factors, the group chairs report, there were 11
25 revisions or enhancements for the Boeing process on performing

1 parts for assembly removal that occurred from 2013 to 2023. Does
2 that sound familiar?

3 MS. LUND: Yes, that sounds familiar.

4 MEMBER INMAN: Okay. Out of those 11, it didn't really
5 define how many were -- and I can get into it a little bit later,
6 but how many of those were self identified that you changed just
7 as Boeing's own internal processes?

8 MS. LUND: I don't have that exact split out. I know some
9 were. And I believe the gentleman tomorrow will have all of the
10 details, but I know some at least were.

11 MEMBER INMAN: Okay. And I know you had referenced earlier
12 that you started about three years ago, an SMS process.

13 MS. LUND: Correct. We started to implement it around 2019,
14 I think, then we really started to increase the implementation and
15 got our voluntary program approved by the FAA I think last year.

16 MEMBER INMAN: Okay.

17 MS. LUND: '22 or '23.

18 MEMBER INMAN: And I noted that in June of 2023, you
19 initiated a safety risk management on removals, specifically. And
20 it was ongoing and that three actions were actually completed. I
21 think that led to a July 24th quality alert from Boeing regarding
22 documentation requirements.

23 MS. LUND: I don't know if those two are 100 percent related,
24 but everything you said is true, but all of those events happened
25 in that rough time frame. Yes.

1 MEMBER INMAN: Okay.

2 MS. LUND: Yes.

3 MEMBER INMAN: So if a quality alert came out in July of '24
4 -- 2023, and yet there was no adherence obviously sometime in
5 September, what's the process for changing the way quality alerts
6 are actually being looked at and understood?

7 MS. LUND: Good question. As was noted before, quality
8 alerts could come out kind of in two ways. Some would be
9 information only, some would require the read and sign. And after
10 this, it became clear that a non-read and sign, we needed, we
11 needed more accountability.

12 So both in terms of improving the way we communicate changes
13 and the way we ensure they are received needs to be more
14 accountable. As I mentioned immediately, well, shortly after the
15 accident, we did put out that read and sign in order to address
16 that very point.

17 MEMBER INMAN: Okay. And do you feel comfortable that that's
18 getting the point across? Because, I'll be honest, I get a lot of
19 things from our departments as read and sign and just open it.

20 MS. LUND: That's fair. That's fair. I think we need to do
21 more. I think we need to do more. There's room for improvement
22 in our removal process in terms of simplifying the process itself,
23 in terms of fixing some of these additional steps, and in terms of
24 ensuring our employees understand.

25 One of the things we are also now starting to work on, Lloyd

1 had mentioned that in the initial training there's not much
2 training. That's another change that we've made to FTC is to put
3 some of this BPI training in there. How you access it, what you
4 do, that's a gap that we found as well, because it was real. We
5 are working on this issue. And I think more work to be done.

6 MEMBER INMAN: Well, I think everyone here would agree.
7 There's always work to be done. But I'm going to go back to the
8 Renton facility in regard to some FAA audits from October 22nd to
9 September 2023. So roughly a ten year period that there were 68
10 alleged noncompliance documented with the FAA. Ten of them
11 regarded document control. Handling and storage, ten. Design
12 control, one.

13 But they were -- none of them were about the Boeing process
14 part or assembly removal. So I guess I'm just trying to tie this
15 into a bigger picture. I know you mentioned that we had work to
16 do on the door assembly and removal. I'm getting the impression
17 there's work to be done everywhere.

18 MS. LUND: Correct. We have taken that history of our audit
19 findings and our most recent audit findings, as I mentioned, the
20 SAI. The FAA had roughly 24 inspectors in our factory for about
21 six weeks on all three shifts and did a comprehensive audit. And
22 we've taken those findings as well, and all of those are in our
23 efforts to go improve our processes and understanding.

24 MEMBER INMAN: I'll wait till the next round, Chair.

25 CHAIR HOMENDY: Thanks very much.

1 I want to return to something that the technical panel asked
2 about just to make sure that our fact pool is correct. Because I
3 feel like I heard something different from Mr. George about
4 lubricant used. Certainly we understand lubricant has to be used.
5 So I'm just going to read this to you to make sure that it's
6 accurate, factual information.

7 On January 17th, the investigative group went to Spirit, this
8 was in 2024, prior to a mid exit door plug being closed on a
9 different fuselage. The installation mechanic was observed using
10 a lubricant, which was Vaseline, and when asked about it, Spirit
11 AeroSystems produced an engineering evaluation that stated the use
12 of Vaseline would not negatively affect the aircraft.

13 I just want to make sure, was that your document, was that
14 Boeing's document, was that something Boeing signed off on?

15 MR. GEORGE: I'm not familiar with your comment on it
16 wouldn't harm the airplane. Although I agree with it. But I'm
17 not, I'm not familiar with that, so therefore I don't know where
18 it came from.

19 CHAIR HOMENDY: Is there an engineering evaluation regardless
20 of what it said, that Spirit produced our employees about the use
21 of -- allowing the use of Vaseline.

22 MR. GEORGE: What I said earlier was starting this May,
23 there's a green line, engineering green line.

24 CHAIR HOMENDY: No, I don't -- I'm going back in time.

25 MR. GEORGE: Yeah.

1 CHAIR HOMENDY: Was, I mean, was there a document that you
2 produced to our employees on January 17th when the investigative
3 group went out that said, an engineering evaluation that said
4 Vaseline could be used. Did you, did you provide that to our
5 personnel.

6 MR. GEORGE: Not that I'm aware of.

7 CHAIR HOMENDY: So that's -- you're saying that's not
8 accurate.

9 MR. GEORGE: I'm saying I'm not aware of that.

10 CHAIR HOMENDY: So that might, might exist, you just -- you
11 personally do not know.

12 MR. GEORGE: Correct.

13 CHAIR HOMENDY: Okay. Just wanted to clarify. We reviewed
14 engineering data and saw a note allowing the use of dish soap, not
15 Vaseline. Are you aware of that?

16 MR. GEORGE: Not specifically. And again, I don't know where
17 the origin would have, would have been, where that came from.

18 CHAIR HOMENDY: Okay. Ms. Lund or Mr. Ackerman, do you allow
19 the use -- was it -- were you aware that they were using Vaseline
20 versus dish soap?

21 MR. ACKERMAN: Not at the time before the accident. Post
22 accident, as we were observing the build of the mid exit door at a
23 same observation, over the next couple of weeks, there was a
24 Spirit engineering evaluation that I was aware of, concurred by, I
25 believe Boeing engineering, to allow the use of dish soap and that

1 I believe is what Mr. George is referring to, which was added to
2 the, to the build plan later.

3 CHAIR HOMENDY: Yes, understand dish soap. I just wanted to
4 make sure there was not some sort of discrepancy. Do you ever
5 find discrepancies in documents between Spirit and Boeing on what
6 is approved?

7 MR. ACKERMAN: Yes, we do.

8 CHAIR HOMENDY: And then you work through that?

9 MR. ACKERMAN: And then we work through that. Yes.

10 CHAIR HOMENDY: Okay, great. I just wanted to understand
11 that.

12 For Spirit, you have three contractors: Launch technical
13 workforce solutions, Aerotech Aviation, and STROM. This includes
14 a director of customer relations who oversees four managers, 20
15 mechanics, and two quality assurance personnel. What's the
16 relationship between -- or how do you ensure oversight, Spirit, of
17 the three contractors? And then Boeing, how do you ensure
18 oversight of Spirit and three contractors? I'll start with
19 Spirit.

20 MR. GRABON: So for the for the oversight, Madam Chair, I'm
21 -- I don't think we can talk to the details until panel two.
22 Panel two will talk, get more in depth because our witness is the
23 over --

24 CHAIR HOMENDY: Okay.

25 MR. GRABON: -- is the manager of those people. I think --

1 CHAIR HOMENDY: All right, we'll --

2 MR. GRABON: -- to give you an accurate answer.

3 CHAIR HOMENDY: Totally fine. We'll come back to that then.
4 Quick question because I -- two questions. You have lockout tag
5 out or called LOTO when you go to a barge, you end up -- can you
6 talk about that really quick when you, when you go to a barge,
7 which is essentially a work area. You have lockout tag out where
8 you use a badge to come in and come out. Explain that for a
9 second.

10 MS. LUND: Sure. There's two processes related that I think
11 you're talking about there. The first is in any position in the
12 factory, when an employee who doesn't normally work in that area
13 every day is assigned in that area, they use their badge to enter
14 the area, and then they use their badge when they exit the area.

15 And that provides a level of visibility or control of who's
16 there. It is related to lockout tag out. Lock out tag out is a
17 process we use once power goes on the airplane, and it's a live
18 airplane. So when you use your badge to enter an area that's a
19 live airplane, there's a position called the GC who educates you
20 and informs you, powers on the airplane. It's off on the
21 airplane.

22 If you need to do work in an area, they make sure that
23 there's no power in that area you're working in. That's how we
24 control the safety and that's why we -- one of the many reasons
25 why we do want to know when someone goes in an area so they can be

1 briefed, and we can ensure before work starts in an area that it's
2 safe for the person to work in.

3 CHAIR HOMENDY: Okay. Great. I have more questions on that.
4 Member Graham.

5 MEMBER GRAHAM: Thank you, Chair.

6 Mr. Catlin, I didn't mean to leave you out a few rounds ago
7 on the question I had on training for employees at Renton, on the
8 different models of the 737. Back prior to the accident, do you
9 feel there was enough differences training for the employees to do
10 the work on the different models?

11 MR. CATLIN: Well, when it comes to training, I think there's
12 two things that need to be looked at. There's training under part
13 21 of the Code of Federal Regulations and part 25 of the Code of
14 Federal Regulations. Part 25 is the engineering side of the
15 house. That's where you get your training on your BAC,
16 engineering drawings, your BAC specs, and how you build the
17 airplane.

18 But training under the part 21 side of the house is on the
19 pros policies and BPI's that we follow when we build the airplane.
20 Back in September of 2023, our foundational training center was in
21 trouble. We had so many new people coming in, they were being
22 pushed through. We were seeing about a 60 percent failure rate
23 coming through foundational training of people who were being
24 hired, who couldn't complete the training. And they were being
25 terminated from the company due to not being able to pass their

1 certification classes.

2 To create a good, solid, functioning mechanic or quality
3 inspector, just because you send them through a class and you get
4 them a certification, does not mean that they are skilled at
5 performing that activity. Using bonding ground, for example,
6 bonding and grounding is a critical part of the aircraft build.
7 And our bonding and grounding processes are broken up into twenty
8 different specifications.

9 So for somebody to go through a class that teaches them how
10 to do a dash seven bond, or to do a dash six fay seal bond or a
11 fay bond, doesn't mean they're actually skilled at going out and
12 being able to accurately perform the work, but they are certified.

13 So I do think that there -- we need a lot of work in our part
14 21 side of the house in training and BAC specifications, PDD,
15 product definition data. But when it comes to actually training
16 people in our BAC -- in our policies, pros, and BPI's, that's --
17 we need an extensive revamp of that training at the Boeing
18 Company.

19 MEMBER GRAHAM: Okay. Thank you for that.

20 Turn back to Ms. Lund. Since you come from the quality
21 organization, there's been some discussion about travel work and
22 all that. I assume you probably have some pretty good metrics on
23 knowing what your primary drivers for travel work are. Would that
24 be a fair assessment?

25 MS. LUND: Yes.

1 MEMBER GRAHAM: Is supply shortage one of them?

2 MS. LUND: Yes.

3 MEMBER GRAHAM: Okay. Does Boeing ascribe to Lean
4 Manufacturing?

5 MS. LUND: Yes.

6 MEMBER GRAHAM: Okay. Thank you. That's all I have, Chair,
7 thank you.

8 CHAIR HOMENDY: Thank you. Member Chapman.

9 MEMBER CHAPMAN: No further questions for this panel, Chair.
10 Thanks.

11 CHAIR HOMENDY: Member Brown.

12 MEMBER BROWN: No further questions for this panel.

13 CHAIR HOMENDY: Member Inman.

14 MEMBER INMAN: I do, I apologize.

15 In fact, Ms. Lund, just to ask, this is a -- it's a great
16 title. I know you've had a lot of questions. It's probably not
17 been a great couple of months.

18 MS. LUND: Things have been challenging, yes.

19 MEMBER INMAN: Fair enough. What -- who did you take over
20 your role from?

21 MS. LUND: I took over my role from Carol Murray (phonetic).

22 MEMBER INMAN: And Carol Murray had the same portfolio that
23 you did.

24 MS. LUND: Close. Not exactly. She obviously didn't have
25 the improvement plan activities that I have now, because it was

1 prior to the accident, for the most part of her tenure. But in
2 general, she had a similar responsibility.

3 MEMBER INMAN: What were your roles before this?

4 MS. LUND: My role before this most recently was the leader
5 of all of our airplane programs, so the leaders of the three, six,
6 seven, and eight seven programs reported up to me.

7 MEMBER INMAN: So that was also the 737-Max's.

8 MS. LUND: Correct.

9 MEMBER INMAN: And I apologize. I guess I just want to --
10 because -- I want to bring up if we can, one of the exhibits. I
11 think it's 11M, at about page 604. Maybe. I know Member Graham
12 was asking about lean processing. Can you make that a little
13 larger? Is that possible?

14 So this is the interview of James Phoenix (phonetic), who was
15 the manager of the Boeing certification from the FAA. He had
16 retired, I believe, in December of 2023. And actually, do we have
17 the right page pulled up, 604? That's six -- okay. I think the
18 next page, that's 603. Thank you. Sorry, scroll up a little bit.

19 So they're talking here about how at line eight changed quite
20 a bit, I wanted to comment that when he -- before we took over
21 from 2015 to 2017, a couple of ex-Toyota managers that were
22 brought in to try to build the airplanes the way Toyota builds
23 cars. I think that's that lean manufacturing discussion.

24 And if you'll drop on down, please. They were not
25 successful. And then he goes on to talk about we embarked on a

1 significant program to get them to put inspections back in, and we
2 did that through compliance and legal enforcement. They complied
3 with all that, but slowly, very slowly did they reintroduce
4 quality inspections. And that didn't really change.

5 We'll go to 605. Until the Max accidents were it brought a
6 lot of things. But I think the big quote out of that, you need a
7 lot of leverage to get Boeing to change. And then when Boeing
8 changes, it's very slow, and it took a long time for them to
9 really understand that their quality system needed to improve.

10 I guess my question is, Ms. Lund, is this a cycle that we're
11 going to see every two or three years, or every four years, to
12 where we have to come back and look at a different thing? I'm not
13 trying to put you on the spot with that, but it seems to be a
14 recurring trend.

15 MS. LUND: Member Inman, I feel like that's a fair question.
16 We are committed that this will not be a recurring, a recurring
17 trend. I'll clarify just a couple of thoughts. We have been on a
18 lean manufacturing journey for quite a while in Boeing. And in
19 fact, the 737 program, more than five years ago, seven, eight,
20 nine years ago, really was our leader in lean manufacturing in the
21 company.

22 And at that time there was, there was really good
23 performance, our quality numbers, our quality defects were down.
24 Our supplier shortages were down. By the metrics we talked about
25 earlier, you would have seen really some pretty robust

1 performance.

2 We got away from that over time. So as it mentions, the two
3 executives that were brought in, they did, they did work on
4 several initiatives, but I just wanted to counter that lean has
5 been with Boeing for a while. We really do believe in lean. One
6 of the premises of lean that we really believe with this, the
7 number one way to improve lean is to improve quality.

8 Those two are integral, and we believe in that. So I'll --
9 just wanted to clarify that. In terms of having to see this
10 again, we are committed that you won't. Administrator Whitaker
11 has asked us many times what is our sustainment plan, how can he
12 and his team, many of whom are located here today, be sure that
13 this won't be overturned in a few years. That these things won't
14 be taken away.

15 And for each aspect of the changes and improvements we're
16 trying to make, we have given some metrics and a sustainment
17 process. And as I mentioned earlier, part of the basis of it will
18 be command media. The FAA will have approval authority of that
19 command media. That's one of the elements. The SMS system is one
20 of the elements. It's becoming required, as I'm sure the
21 committee understands, in the future.

22 But we're doing it voluntarily already. Use of that for the
23 changes of our processes will be another method. So we are
24 continuing to work on these areas that will give confidence both
25 to us but to all of you and the FAA as well, that these changes

1 will stick.

2 MEMBER INMAN: Can I make one suggestion?

3 MS. LUND: Sure, please.

4 MEMBER INMAN: Stop talking about leaner in quality and start
5 talking about safer manufacturing.

6 MS. LUND: Agree. Agree.

7 MEMBER INMAN: I think my time's up, ma'am.

8 MS. LUND: Thank you.

9 CHAIR HOMENDY: Thank you very much.

10 When investigators asked a Boeing executive about quality
11 assurance on the 737 line, he said that supplier performance was
12 the number one issue. We dug a little deeper and asked about
13 whether that was quality -- from a quality perspective or a
14 shortage perspective. The response was quality. Spirit, and I'm
15 quoting, Spirit was the number one driver in terms of number one
16 defects in the production system. Defects, nonconformances,
17 escapes was not an unknown issue.

18 Manufacturing defects, in fact, were well known dating back
19 to 2018 and 2019, as reflected in numerous Boeing internal audits,
20 FAA audits, and interviews with your own employee. In fact, in
21 2019, FAA found Boeing failed to adequately oversee its suppliers,
22 Spirit, to ensure they complied with the company's quality
23 assurance system.

24 You know, I have to say, when we went through the
25 transcripts, it was pretty striking to me. And I'm just going to

1 read a few. One Boeing employee, not a contractor, said planes
2 come in jacked up every day. Planes come in jacked up every day,
3 every day. Meaning you're -- you were at the time receiving,
4 quote, unquote, jacked up planes.

5 All the planes that -- another employee, all the planes that
6 come to us always have an issue with structures, skins, open
7 holes. Another employee said, on questioning of our investigative
8 team, if you had, think of your family, tomorrow you got on an all
9 -- got an all expense paid trip wherever, dream to wherever your
10 dream vacation is, and you can package up your family and you can
11 go there, and you knew you were flying on an aircraft that had
12 come out of this facility, how would you feel about that? He
13 responded 70 percent, I'd be worried. 70 percent I'd be worried
14 because I know, I work inside here.

15 In fact, you stated that there is a history of knowing
16 quality assurance concerns with Spirit. Would you agree with
17 that, that you have -- this has been a known issue with defects,
18 nonconformances, escapes. Is that correct? Yes or no.

19 MS. LUND: Yes.

20 CHAIR HOMENDY: Yes. It was a, in fact, I'm a little bit --
21 I think I'm -- and we can get into this, and I'll let you think
22 about this question in the next round. You stated we know there
23 have been quality escapes. We know there are document, lack of
24 documentation, removal issues. Just out of an abundance of
25 caution, put end of line inspections in place.

1 You know, I just, I just want to understand why not earlier.
2 But actually before I do that, can we pull up the KPI's? And I'm
3 going to ask, you know, while that's being pulled up, employee
4 proficiency is one of -- this was part of this, you know,
5 comprehensive 90 day plan that FAA required. KPI's, first one is
6 employee proficiency, while Leani pulls that up. Employee
7 proficiency.

8 So we had various production rates. And I will just say in
9 looking, it looks like you were at 26 per month at one point,
10 around 21, 31. And at some point you were up to 42, well, granted
11 that was down to 50 -- from 52.

12 So production rates were kind of up and down. And then you
13 had employee turnover, massive employee turnover, especially after
14 COVID, that's documented throughout the exhibits. So you
15 obviously indicated there were some training issues. This is all
16 information that Boeing has been collecting and has seen over the
17 course of a number of years. So concerns related to we have a new
18 workforce, and believe me, we're seeing that too here. You have a
19 new workforce, you have training issues. Would you agree that was
20 something that was evident for years?

21 MS. LUND: Yes, since COVID, yes.

22 CHAIR HOMENDY: Okay. So we've all -- we've talked about
23 supplier shortages. Escapes, escapements, and reworks. That's
24 something that has occurred for years.

25 MS. LUND: Yes.

1 CHAIR HOMENDY: Yep. Rework hours per airplane. Obviously
2 you have a number of reworks, that has been documented for years.
3 You have had traveling work in the factory. Correct?

4 MS. LUND: Yes.

5 CHAIR HOMENDY: Travel -- and then defects at time of
6 ticketing. So obviously you know about the defects. I guess my
7 point is here, these are all known issues. They've been known for
8 a number of years. This is all information that has been fed into
9 Boeing. And now it's part of this -- this is your -- these are
10 your KPI's to ensure -- to know the health of your production.

11 How do we know these are the right numbers if they were
12 already available to you for years?

13 MS. LUND: We look at many, many metrics, as you could well
14 imagine, well beyond these six. We have, we have metrics that go
15 down to various levels of the organization, that roll up to here
16 beyond this. And we have worked on improving these metrics for
17 years.

18 We -- these are the ones we watch. We would love for things
19 like rework hours, escape hours, supplier shortages to be zero.
20 That, of course, is the target. I don't think that will happen in
21 aerospace. Some defect could happen. We have a system that will
22 make sure it's okay.

23 So we will continue to work on these. We will continue to
24 work on driving them down. What it -- what our conversation
25 really was across Boeing, and then with our regulators at the FAA,

1 was here is a handful, six metrics that can represent and tell you
2 how our overall health is. It's a window into the production
3 system without having to look at 100 or 200 metrics that we can
4 spread out across everyone, that says are we operating in our --
5 the control limits of our baseline system, or are we out?

6 I just, I don't want to imply that we just started working on
7 these. We have not. They have been available, and we have worked
8 very hard to continue to drive these down.

9 CHAIR HOMENDY: May I ask one follow up question?

10 MS. LUND: Sure.

11 CHAIR HOMENDY: To my colleagues.

12 MEMBER GRAHAM: Okay.

13 CHAIR HOMENDY: So these are metrics you've had for a number
14 of years, they have existed. Why does it take a door plug coming
15 out of a plane to now say, hey, these are the metrics, this is how
16 we're going to determine health. We've got a serious tragedy that
17 occurred. How do we know this is the fix? This is it. This is
18 how we're going to ensure, you know, system health.

19 MS. LUND: I think what's changed is small changes to each
20 one of those. But putting them together as a package and saying
21 it's really the control limits, using the control limits as part
22 of our safety management system, triggering a safety risk
23 assessment, when we trigger one of these upper control limits so
24 that we have a mitigation plan, we have a safety risk assessment.

25 And then allowing the -- providing the FAA full access to

1 this. In the system that they have access to, they can see the
2 safety risk assessment. They can see the mitigation plan. They
3 can see performance to the mitigation plan. We're continuing to
4 improve it, but it's there, it's 100 percent transparent. It's
5 agreed to with these control limits with an agreement of when
6 something hits this level, action needs to be taken. It'll be
7 documented here and in -- that it can be seen real time.

8 CHAIR HOMENDY: I have a follow up, but I'm going to --

9 MS. LUND: Sure.

10 CHAIR HOMENDY: -- I'm going to let -- first check. Nope.
11 Member Inman.

12 MEMBER INMAN: And I apologize. I know I'm standing between
13 everyone and lunch. I've been trying to be helpful with the
14 bathroom breaks. Yeah.

15 So actually, Doug, we're going to go down the row a little
16 bit, if that's okay.

17 MR. ACKERMAN: Absolutely.

18 MEMBER INMAN: One thing that we learned about, and every one
19 of these incidents are a lot of other things that went right and
20 what went wrong, and we spoke earlier that we're not going to talk
21 about the actual day of the incident, with a 6-year-old
22 unaccompanied minor, if you read into the report, donned his own
23 oxygen mask, was sitting there quietly. He wasn't filming on
24 YouTube, anything, so hats off to that child.

25 What I'm concerned about is we also learned during that, is

1 that from 2009 and -- excuse me, 2019 to 2023, incorrect parts
2 were being put on not only all the Max's, but I believe the NG's,
3 approximately 680 airplanes, in regard to the strips that hold the
4 oxygen canisters in place. Are you aware of this?

5 MR. ACKERMAN: I am aware that there was a change to the
6 actual engineering of the passenger service units. And that that
7 change -- the parts that we are -- were being produced, were
8 produced conforming to the engineering of the passenger service
9 units at the time.

10 We are aware that -- we had fleet reports that there was
11 migration of the oxygen bottles on the passenger service units.
12 That was pre-accident. That was in 2023. I believe it may have
13 been 2022. We had taken action to reverse that design change.
14 Our engineering team took action to reverse that design change.
15 And we had put an alert out to the fleet.

16 MEMBER INMAN: So I know it was not -- so it's a
17 nonconforming part. Is that correct?

18 MR. ACKERMAN: It was a conforming part. It was conforming
19 to the engineering.

20 MEMBER INMAN: But it wasn't working right.

21 MR. ACKERMAN: Correct.

22 MEMBER INMAN: Is that correct?

23 MR. ACKERMAN: Yes. That's why the engineering change was
24 reversed and went back to the original adhesive.

25 MEMBER INMAN: I guess my question is if we're going to take

1 immediate action on things, this was first reported in April of
2 2023 by one operator who was doing a pre inspection, predelivery
3 inspection, and then reported again later in that year. And then
4 was found in this instance I believe in. Alaska 1282, every one of
5 the oxygen generators except for two had migrated out of their
6 position.

7 Now, luckily they worked. But everyone of them but two. It
8 wasn't until approximately April of 2024, over a year after the
9 first report, that a draft MOM went out, and that was only because
10 an AD was coming from the FAA. Why does it take so long to make a
11 change whenever it's just simple things that people need in an
12 emergency like oxygen?

13 MR. ACKERMAN: I don't have the details on that particular
14 investigation. I know that the investigation started and reached
15 the conclusion in 2023, a few months after the initial report.
16 And the design change had been implemented shortly thereafter.

17 MEMBER INMAN: But if you're in charge of the supply chain,
18 you weren't read in on why that needed to change?

19 MR. ACKERMAN: I was not directly. I was our safety
20 organization, our engineering organization we're leading that
21 investigation.

22 MEMBER INMAN: But it had to do with the supplier parts, or
23 in general, are you made aware whenever there's a safety issue
24 that involves supplier parts?

25 MR. ACKERMAN: I was aware of that, of that report, and that

1 there was a need for a design change to revert the design back to
2 the original configuration.

3 MEMBER INMAN: But you weren't aware -- sorry. Earlier you
4 said you weren't aware of this investigation.

5 MR. ACKERMAN: I wasn't aware of the details of that
6 investigation. I wasn't aware of the specific timeline on that
7 investigation. I was aware that there was an active investigation
8 that resulted in having to change the design back to the original
9 configuration.

10 MEMBER INMAN: But what if an operator comes to you in two
11 separate situations, and says we've found a flaw or issue.
12 Shouldn't that trigger an alarm? Because it looks like the
13 investigation didn't happen until those oxygen canisters came into
14 NTSB, basically into our possession, and they were noted in the
15 chairman's -- in the Chair's report about a month later.

16 MR. ACKERMAN: I believe those went into our safety process.
17 There was what we call a COS written that identified the potential
18 for a risk -- the potential for a safety issue, potential for a
19 risk. And that went through the safety process and ultimately was
20 determined safety, which drove the, which drove the action both
21 for production and into the fleet.

22 MEMBER INMAN: And whenever the, whenever the safety bulletin
23 went out, how many -- do you have the rough facts? How many
24 actually had to be changed out, or how many were incorrect?

25 MR. ACKERMAN: I don't have that. I don't have the data on

1 that, no.

2 MEMBER INMAN: Can you get us -- get that for us?

3 MR. ACKERMAN: I can. Yes.

4 MEMBER INMAN: Thank you. Thank you, Chair.

5 CHAIR HOMENDY: Thank you. I just have one question, and the
6 rest of my questions can go to the next panel. But again, I want
7 to make sure everybody gets their time to ask questions. Just
8 Ms. Lund, I read in your June 25th press remarks that as a result
9 of the new predeparture inspections, that you have seen up to an
10 80 percent reduction in defects.

11 I'm just curious, 80 percent of what? What would that -- did
12 do you track the number of defects that you were seeing?

13 MS. LUND: These are -- these -- this is the pre inspection
14 coming out of Spirit.

15 CHAIR HOMENDY: Mm-hm.

16 MS. LUND: To those we're finding here.

17 CHAIR HOMENDY: Yep.

18 MS. LUND: So although the numbers may be similar for the
19 inspection, but because we're catching them at Spirit, and
20 reworking them at Spirit, when we get the fuselage here and we do
21 the review and write the detailed pickups, that's where we have
22 seen the reduction showing that we've made significant improvement
23 through this process at Spirit.

24 CHAIR HOMENDY: Understand. Do you -- how -- so what was the
25 total you were seeing though at Spirit? Were you tracking how

1 many defects were occurring before this process, or even up to the
2 end of line inspection that you just created?

3 MS. LUND: At Spirit, we weren't tracking it prior to this
4 process and prior to --

5 CHAIR HOMENDY: Okay.

6 MS. LUND: -- the implementation of this process, we were not
7 tracking that then.

8 MR. ACKERMAN: Not the internal Spirit findings, by Spirit
9 quality.

10 MS. LUND: Correct, correct.

11 CHAIR HOMENDY: So 80 -- so what was the 80 percent based on?
12 I'm just confused.

13 MS. LUND: No. Off the inspection we were doing here in flow
14 day zero or one, that we were finding here. So it's a flow day
15 one to flow day one comparison.

16 CHAIR HOMENDY: I see.

17 MS. LUND: Flow day one when we weren't inspecting at Spirit
18 compared to flow day one after the inspection and rework at
19 Spirit.

20 CHAIR HOMENDY: Okay. So then what was the total in flow day
21 one that you were seeing? What's the -- 80 percent of what?

22 MS. LUND: I have not refreshed myself in those numbers.
23 What I will say is they varied widely on fuselage, the fuselage.
24 And I have not reviewed -- refreshed myself on the exact numbers.

25 CHAIR HOMENDY: Understood. Okay. I will move the rest of

1 my questions to the next panel. But Member Imman, if you have
2 questions, go for it.

3 MEMBER INMAN: What's for lunch?

4 CHAIR HOMENDY: Okay. All right. So we are going to break
5 for lunch. For a couple of us, we have conference room, one of
6 the conference rooms for the Chair's call about a particular
7 crash. And so we'll move to there real quick before we have
8 lunch.

9 So we have -- oh, I said it was a highway crash earlier.
10 Yeah, yeah. So we will break for one hour. We will come back at
11 3:30. Does that work for everybody? Yes. Good. Go eat. I know
12 it's late. Eat a lot. But don't fall asleep when you come back.

13 And see if they're -- look, they're all waving. Perfect.
14 Did anyone leave a purse up here? Are the parties okay to
15 proceed? Machinists? You have all your people. Okay. Give it a
16 couple more minutes and then we'll start up.

17 (Off the record)

18 (On the record)

19 MR. BRAZY: In other housekeeping, we should be allowed to
20 bring water through the security screener as of moments ago. So
21 now that you're here, it's great to tell you that. But if there's
22 a problem with that, grab --

23 CHAIR HOMENDY: We're going to go ahead and get started.
24 Yeah. Okay, great. So just a little bit of a change here.
25 Member Brown is launching to a highway crash in Florida, so our

1 hearts certainly go out to those that were involved and we will be
2 thinking of them, and then certainly thinking of Member Brown as
3 he, as he travels to Florida.

4 So he has passed his questions on to us. Our work doesn't
5 end unfortunately. And so he will be doing that, and we will take
6 over his questions throughout this. But you might beat us on
7 those questions. So Mr. Bray, will you please begin the
8 introductions and swear in the witnesses?

9 MR. BRAZY: Thank you, Chair Homendy. The second panel will
10 address events surrounding the opening and closing of the mid exit
11 door plug. The panel will cover Boeing 737-Max9 production
12 specific to the accident airplane. The lack of documentation of
13 the mid exit door plug being opened and closed. The removal and
14 reinstallation of the mid exit door plug at Boeing task
15 management.

16 Description of flow and component travel during assembly.
17 Assembly line flow pace and how it's determined. Procedures for
18 reporting and addressing discrepancies, anomalies, or concerns
19 from the floor on up at Boeing and Spirit AeroSystems. What can
20 be learned from the Shipside Action Tracking for the accident
21 airplane.

22 The role of Spirit AeroSystems employees in the Renton -- in
23 Renton, staffed by Aerotech Strom Aviation and Launch. And
24 changes made following the accident.

25 The NTSB technical panel to my right is composed of Mr. John

1 Lovell, investigator in charge. Mr. Pocholo Cruz, lead aerospace
2 engineer. Mr. Nils Johnson, aviation accident investigator for
3 maintenance. And Dr. Sabrina Woods, senior human performance
4 investigator.

5 Witnesses for panel two include Ms. Elizabeth Lund, chair,
6 quality operations -- quality operations council and senior vice
7 president for quality at Boeing Commercial Airplanes. And
8 Mr. Michael Riney, senior manager for manufacturing, general
9 support at Spirit AeroSystems.

10 I now ask that the witnesses not previously sworn in, please
11 stand to be sworn in. Raise your right hand.

12 (Whereupon,

13 MICHAEL RINEY

14 having first been duly sworn, were examined and testified under
15 oath, as follows:)

16 MR. BRAZY: Thank you. Please be seated. As a reminder to
17 the witnesses, you will remain under oath until the conclusion of
18 the hearing. We ask that you answer questions factually and avoid
19 analysis.

20 Finally, please push the microphone button to talk, and push
21 it again when finished. Chair Homendy, these witnesses have been
22 prequalified and their respective experience and qualifications
23 appear in the docket as exhibits. I now turn the questioning over
24 to Mr. Cruz.

25 INTERVIEW OF MICHAEL RINEY

1 MR. CRUZ: Thank you, Mr. Bray.

2 Mr. Riney, what are your roles and responsibilities as the
3 Spirit AeroSystems senior manager, manufacturing, general support?

4 MR. RINEY: Yes. I work on site at the Boeing Renton
5 facility. I'm a liaison between the Spirit and Boeing teams.
6 Daily, I perform my involvement with the Boeing teams at their
7 morning meetings, general meetings, and I also communicate any
8 concerns from the Boeing team, or help needed.

9 Conversely, I also, if there are help needed from the Spirit
10 team, I work to communicate those items and help. It's a -- more
11 of a customer relations type role working with between both teams
12 to help integrate and communicate.

13 There's also, sorry, there is also support team of Spirit
14 contract managers and Spirit mechanic contractors that report up
15 through me.

16 MR. CRUZ: Thank you. Where was the left hand mid exit door
17 plug manufactured for fuselage 8789.

18 MR. RINEY: Subang, Malaysia.

19 MR. CRUZ: Were there any issues during the manufacturing of
20 the left hand mid exit door plug in Malaysia?

21 MR. RINEY: None that I've made aware of, no significant
22 issues.

23 MR. CRUZ: When did Spirit receive the left hand mid exit
24 door plug on 8789?

25 MR. RINEY: There's an exhibit that we'd like to share. It's

1 a Spirit timeline that would help with referencing those dates.
2 As you can see by the timeline created by Spirit, the plug was
3 manufactured by Spirit Malaysia, March 24th. It was received into
4 Spirit Wichita May 10th of 2023.

5 MR. CRUZ: Was there a receiving inspection for that plug
6 when it got to Wichita?

7 MR. RINEY: No. The inspections would be performed by the
8 Spirit Subang, Malaysia team during the build.

9 MR. CRUZ: How do you know -- how does Spirit know that there
10 weren't any issues during shipping?

11 MR. RINEY: During the uncrating process, if any items were
12 identified by the mechanics once it was transported to the area
13 for installation, the Spirit mechanics or quality personnel have
14 the ability to elevate those to area QA to have documented.

15 MR. CRUZ: When was the left hand mid exit door plug
16 installed on 8789?

17 MR. RINEY: If you could pull up the timeline again. I
18 believe it's referenced there. Yeah. I don't see it referenced
19 on that timeline, but it -- I believe it was in the September of
20 2023 timeframe. I can get the exact date and let you know.

21 MR. CRUZ: Do the installers of the mid exit door plugs need
22 special training or certification to install the plug?

23 MR. RINEY: No. There's on the job training that the Spirit
24 personnel in Wichita go through to understand the installation and
25 ensure that they are following the IP installation plan.

1 MR. CRUZ: According to Spirit production paperwork, the left
2 hand mid exit door plug is pre rigged when it leaves Wichita.
3 What does pre rig mean, and when is the final rig accomplished on
4 the mid exit door plugs?

5 MR. RINEY: Pre rigging involves working to a rig document.
6 There's a drawing sheet number identified in that rig document,
7 and we follow all of the inspections or gap requirements related
8 to the rig document. But we do not perform the final rig. The
9 final rig is under certain -- the fuselage itself has to be in a,
10 in a certain configuration before final rig can be performed.

11 MR. CRUZ: And what configuration is that?

12 MR. RINEY: With the wings joined to the aircraft and the
13 aircraft weight on wheels. I believe engines may also have to be
14 installed at that point.

15 MR. CRUZ: What type of inspections are accomplished on the
16 mid exit door plugs upon installation?

17 MR. RINEY: There are fit and fair requirements on the
18 exterior, which are the outboard or inboard, the plug is from the
19 fuselage cut out. And then there is a gap requirement around the
20 circumference of the plug, also in the cut out.

21 There are multiple other gap requirement inspections that are
22 performed common to the stop fittings on the interior. And then,
23 of course, the final installation and ensuring all hardware are
24 installed.

25 CHAIR HOMENDY: I'm sorry, Mr. Cruz, could you yield for a

1 second? Just because we're on the subject now, and I mean, we're
2 kind of talking about it up here. I don't want -- we don't want
3 to come back to it.

4 What happens during pre-rig? What happens during rigging?
5 And is that done in Wichita?

6 MR. RINEY: So pre rig is just ensuring all of the
7 requirements from the rig document are met prior to shipping from
8 Wichita. Because there are configuration changes to the fuselage,
9 of final rig has to be performed at Boeing in Renton.

10 MR. CRUZ: Were there any issues in the installation and pre
11 rig of the left hand mid exit door on 8789 while in Wichita?

12 MR. RINEY: Boeing performed a rig verification on the unit
13 when it loaded into the factory in Renton. There were no defects
14 noted on the left hand. And that, I believe that IP for Boeing
15 closed out on September 5th.

16 MR. CRUZ: Thank you.

17 Mr. Johnson.

18 MR. JOHNSON: Good morning, or afternoon. Sorry. My
19 questions are for Mike Riney at this point. Mike, who -- or
20 sorry, Mr. Riney, who fabricates the edge frames for the 737 MED
21 plug?

22 MR. RINEY: A --

23 MR. JOHNSON: Fuselage opening. I'm sorry.

24 MR. RINEY: There's a supplier by the name of Quick Tech that
25 manufacturers the door surround structure.

1 MR. JOHNSON: Okay. Following up on Mr. Graham's question,
2 what type of receiving inspection is accomplished when the edge
3 frames are received at the supplier?

4 MR. RINEY: So once they've received at Spirit, I don't
5 believe any receiving inspection is performed. I believe
6 Mr. Grabon answered that earlier today, that Quick Tech, or that
7 the supplier has an internal delegation that allows them to
8 perform the inspections on the completed assembly prior to
9 shipping.

10 MR. JOHNSON: Okay. In the fuselage production documents, is
11 there any inspection for rivets of the edge frames after
12 installation?

13 MR. RINEY: No specific inspections are performed. If,
14 however, there was damage or something noted that did require
15 documentation, then Spirit manufacturing or QA would request that
16 be documented.

17 MR. JOHNSON: Why is it that Spirit did not detect the
18 fastener issue, but yet, Boeing detected it on its inbound
19 receiving inspection at Renton?

20 MR. RINEY: So I think throughout the manufacturing process,
21 Mr. Grabon also alluded to this earlier, that if there are items
22 identified that are suspect, and do not turn out to be defective,
23 they would not be documented.

24 MR. JOHNSON: Okay. When was the last time Spirit
25 accomplished an audit of its edge frame supplier?

1 MR. RINEY: So I believe we have an audit schedule for Quick
2 Tech. I believe the last audit, the actual on site audit was in
3 January. That may have been an audit of their paperwork though.
4 An actual on site audit took place in March based on the feedback
5 from the rivets that were identified, but no defects were noted.

6 MR. JOHNSON: When you said January, do you mean January of
7 '24?

8 MR. RINEY: Yes. I believe so.

9 MR. JOHNSON: Do you know when that -- when it was audited
10 prior to that?

11 MR. RINEY: I'd have to refer to the documentation, but I can
12 get that information for you.

13 MR. JOHNSON: In the January 2024 audit, were there any
14 significant issues found? And if so, can you share them?

15 MR. RINEY: No significant issues were found, and an
16 inspection of the door edge frame assemblies that were on site in
17 Wichita were also performed, and no defects were noted.

18 MR. JOHNSON: What actions has Spirit undertaken to ensure
19 that defects such as the discrepant rivets on the edge frame
20 identified -- are identified early in the spirit manufacturing
21 process and not transmitted to Boeing?

22 MR. RINEY: As we discussed earlier, multiple improvements to
23 the inspection process have been made by Spirit. There has also
24 been the final product verification performed jointly with Boeing
25 prior to shipping to Renton.

1 MR. JOHNSON: Mr. Cruz.

2 MR. CRUZ: Thank you.

3 Mr. Riney, could you please describe the Spirit process when
4 Boeing production requests the vendor or supplier assist, starting
5 from the assignment to the final sign off of the work?

6 MR. RINEY: Prior to the incident, or in the 2023 timeframe,
7 or post?

8 MR. CRUZ: Yes, yes, '23, yeah.

9 MR. RINEY: Okay. So prior to the incident, Spirit had
10 contract mechanics and contract inspectors. When an issue was
11 raised, Boeing would notify spirit. There's a packet that we
12 request prior to beginning the rework. This packet includes
13 normally the rework materials, as far as the NCR pickup, drawings
14 associated with the defect, and any associated parts.

15 At that point, when the packet is received, the Spirit
16 contract managers will then identify an individual to begin the
17 rework, once it's accepted. And we ensure we have all the
18 appropriate items in the packet. At that point, they assign it to
19 a mechanic. The mechanic will then go to the airplane in question
20 and will review if they've got access to the area to begin the
21 rework.

22 If there isn't sufficient access, they reach out to
23 appropriate Boeing individuals to let them know what access is
24 needed, and if there's potentially removals required to gain
25 access to that area. It can be, at some points, just somebody

1 else performing work in the area. But again, there could also be
2 access or removals required.

3 At that point, since they cannot begin work right away, they
4 will then go to the Spirit contract manager and request a new
5 assignment. And at that point, if they are able to begin rework,
6 for an example, if there's a mislocated bracket. They will get
7 the removal, they'll begin the rework. If a whole check is
8 required or an in process inspection is required, they'll contact,
9 at that time, the Spirit quality do come inspect prior to
10 reassembly.

11 And then we can stamp off in Boeing's CMES system what work
12 was performed. And then the final operation would then be
13 completed by Boeing quality for the final review of the rework.

14 MR. CRUZ: So after the accident, what changed in that
15 particular process?

16 MR. RINEY: After the accident, we were requested to exit the
17 Spirit quality team members. And at that point, Boeing quality
18 would then take over all in process and final inspections.

19 MR. CRUZ: In September of 2023, how many Spirit employees
20 worked in the Renton facility?

21 MR. RINEY: I believe there were four contract managers, 20
22 contract mechanics, and two contract QA.

23 MR. CRUZ: I'm sorry. What was the last part?

24 MR. RINEY: Two contract QA --

25 MR. CRUZ: QA.

1 MR. RINEY: -- quality.

2 MR. CRUZ: Quality. And what shifts did the Spirit employees
3 typically work?

4 MR. RINEY: Usually it was a 6:00 to 2:30 -- 6 a.m. to 2:30
5 p.m. shift Monday through Friday, but we did on occasion work
6 weekends. That normally gave us a good opportunity to perform any
7 rework while Boeing employees may not be in the area working.

8 MR. CRUZ: So in Renton, how many Spirit employees are direct
9 hires to Spirit?

10 MR. RINEY: In Renton, it's just myself.

11 MR. CRUZ: Just yourself.

12 MR. RINEY: Correct.

13 MR. CRUZ: And what's the reason Spirit chooses to hire
14 contract employees in Renton rather than direct hire.

15 MR. RINEY: As discussed earlier today, there is a large
16 availability of skilled mechanics in the Washington area. This
17 allows Spirit to adjust our workforce levels based on the
18 requirements of Boeing, whether that be up or down.

19 MR. CRUZ: So how does Spirit ensure that contractors used to
20 perform warranty work for Spirit, that Spirit is responsible for,
21 are qualified and trained to be able to accomplish the
22 manufacturing task at Boeing?

23 MR. RINEY: So I am responsible for all of the hiring of the
24 contract mechanics. I personally review all of the resumes
25 submitted by our contracting house. And I ensure that only those

1 individuals with previous aircraft, specifically sheet metal
2 experience, are part of those that we submit offers to.

3 At that time, in 2023, the mechanics would then come to
4 Renton, and we would have Spirit trainers in Renton to perform any
5 required training and any certification requirements, sealing,
6 bond and ground, as was mentioned earlier. Or that type of thing,
7 to ensure that they were qualified.

8 We would then also perform any Boeing sites. We would
9 request Boeing assistance for any site specific training. They
10 would need tool crib access for certified tools, or to access the
11 LSCC barge, check in checkout process.

12 MR. CRUZ: So there is some type of Boeing training for the
13 contracted mechanics.

14 MR. RINEY: Only for the required training to access the
15 airplane.

16 MR. CRUZ: Okay. Are Spirit employees familiar with the
17 Shipside Action Tracker? Are they allowed to gain access to that
18 particular system, that Boeing system?

19 MR. RINEY: We do not have access to Shipside Action Tracker.
20 Any communication regarding SAT's is through email or printed
21 copies.

22 MR. CRUZ: But what does Spirit use in Renton to keep track
23 all the work that Boeing is requesting?

24 MR. RINEY: There is a Excel, or it's a system at Boeing that
25 tracks all of the Spirit coded items. And then we received that

1 in in Excel sheet daily, and it's reviewed for any new items that
2 may have added -- been added. And at that -- I review those items
3 so that I have an understanding of what is being documented and
4 what will be -- may be requested to work. Not -- we do not always
5 get the request to rework all items.

6 MR. CRUZ: Are Spirit personnel allowed to sign off Boeing
7 production records after Spirit's work is accomplished.

8 MR. RINEY: Yes. We do work with the Boeing team to get
9 specific supplier access to CMES. We do -- that does not give us
10 access to all options within CMES, only the supplier version.

11 MR. CRUZ: And what is the supplier version like?

12 MR. RINEY: It still allows us to stamp off on the work. But
13 we cannot put calls up for notification to QA if there's a
14 revision needed to an NCR. For that we must go to Boeing to help
15 with.

16 MR. CRUZ: I believe you said this, but I will ask it anyway.
17 How is Spirit access to the aircraft and rework to be performed in
18 Renton determined?

19 MR. RINEY: So that's normally once the mechanics receive the
20 work to be performed, they will go out to the airplane, and
21 physically look in the area, and ensure that they can begin that.
22 If they cannot begin the work, then it's a matter of going back to
23 the Boeing team and requesting that access, whether that's the
24 LSCC or Boeing manager that we coordinate with to help with.

25 And at that time, it's purely on Boeing to understand if they

1 have the individuals available to gain that access and how they
2 would then prioritize when that access was given.

3 MR. CRUZ: Does Spirit provide any specific training to its
4 personnel regarding gaining access to previously installed
5 assemblies?

6 MR. RINEY: If you're referring to removals, they understand
7 that they are not allowed to perform any removals of structure
8 that is not installed already by Spirit. Any Boeing installed
9 installations, they know they can't touch. Even the Spirit
10 installed completed items in some cases, we will request removals
11 for, just to ensure that we have all that documentation in place.

12 MR. CRUZ: Was that a recent change or was that -- was that
13 same process --

14 MR. RINEY: That same process has been followed, yeah, for a
15 while.

16 MR. CRUZ: And when was fuselage 8789 shipped to the Boeing
17 Company?

18 MR. RINEY: I believe if you've got the timeline to pull up,
19 I believe it was in October, or excuse me, August of 2023. Yeah.
20 August 20th of 2023, the fuselage shipped. And it followed that
21 train ride up Wichita to Renton.

22 MR. CRUZ: Thank you.

23 Mr. Johnson.

24 MR. JOHNSON: Ms. Lund, when did Boeing receive fuselage
25 8789?

1 MS. LUND: And if we could pull up the Boeing timeline, I
2 think that will help as we go through this conversation. We
3 received it on August 31st.

4 MR. JOHNSON: Okay. What inspections were accomplished on
5 the fuselage when it arrived at Renton?

6 MS. LUND: The inspection that was described earlier, the
7 receiving inspection was conducted during flow day one. If I may
8 just to orient everyone to the chart so it's not confusing and
9 then I'll reference the chart. When you look at the chart, the
10 blue timeline are business days or manufacturing days. The gray
11 dates are weekends or holidays for which work is not necessarily
12 scheduled.

13 In the top line, you'll see the calendar date. Right below
14 that you will see the flow day as it was proceeding through the
15 production system. So on September 1st, it was loaded into flow
16 day one, per the chart, and that is where we did the inspection.
17 We did the inspection of the, as I described earlier, of the
18 previous defects that we had found, skin quality, a fastener, FOD,
19 et cetera. And that was conducted on September 1st.

20 MR. JOHNSON: How were the five nonconforming rivets
21 discovered on the forward edge of the frame on the left hand MED
22 plug opening? Sorry.

23 MS. LUND: I'm sorry, did you say when?

24 MR. JOHNSON: No, how.

25 MS. LUND: How.

1 MR. JOHNSON: What inspection?

2 MS. LUND: During that inspection, during that inspection, it
3 was noted that those rivets were nonconforming with our
4 requirements or our specification, and it was written on a
5 nonconformance at that point.

6 MR. JOHNSON: Okay. During the investigation and even
7 earlier in this hearing, we heard the term vendor or supplier
8 assist in production. Could you please provide a brief
9 description of what that process is?

10 MS. LUND: Yes. That's the process when a -- we ask a
11 supplier to come and rework a part or an assembly that they have
12 delivered to us, that is under their purview. In this case it's
13 Spirit, Spirit has a large part of our vendor assist. Another
14 example is we have seat manufacturers come and work on a seat,
15 which is covered under a TSO.

16 That is where we use the kinds of things we use vendor
17 assists. In this case, Spirit employees are asked to work on
18 Spirit product that where we find a defect that is under their
19 statement of work or their responsibility.

20 MR. JOHNSON: For clarification for the Boeing process, are
21 vendors allowed to disturb previously signed off installations?

22 MS. LUND: Not without contacting Boeing first. And having
23 Boeing provide the removal, or ensuring that the removal, or the
24 appropriate paperwork is documented.

25 MR. JOHNSON: And if a removal is generated, it would be

1 Boeing personnel that would perform that removal.

2 MS. LUND: That is correct.

3 MR. JOHNSON: Similarly, are vendors allowed to reinstall
4 assemblies themselves.

5 MS. LUND: They are not allowed to buy off the permanent
6 work. They're certainly not allowed to reinstall the Boeing
7 statement of work. You take the example of a bracket, Spirit may
8 reinstall the bracket. It would be bought off. If you take an
9 example more like a plug or a blanket installation that is
10 removed, the vendor does not reinstall that. Boeing reinstalls
11 Boeing's work and then buys that off.

12 MR. JOHNSON: In the Boeing production process, what
13 determines the need to generate paperwork under BPI 1581?

14 MS. LUND: BPI 1581, as was mentioned earlier, is our Boeing
15 process instruction document for removals. The document requires
16 that any completed work that had been previously completed or
17 installed on an aircraft, when being removed or opened back up,
18 needs removal paperwork.

19 In the document, as was mentioned earlier, there is a
20 criteria and explanation for what things need it. There is a flow
21 chart that talks about when it's needed. And then as was
22 mentioned, I believe by Mr. Catlin, there is an exception appendix
23 in the back for things that do not need a removal.

24 MR. JOHNSON: Excuse me. I know we mentioned earlier that
25 today all production personnel who want to write removals have to

1 have training. Is that training recurrent?

2 MS. LUND: We have recurrent BPI 1581, recurrent training
3 today, yes.

4 MR. JOHNSON: Okay. In the production process. What is the
5 function of the door team at the Renton factory?

6 MS. LUND: Our door mechanics are a specialized group of
7 employees. We often give employees a specific job skill code if
8 they provide a specific function. A door mechanic is one of
9 those. It's a specific skill and function.

10 Ad the door crew and the door teams fundamentally do all of
11 the aspects associated with our doors. They rig our passenger
12 doors, they do our rig checks for this mid exit plug, or for other
13 doors. They do work associated with the doors. It's a specialty
14 skill.

15 MR. JOHNSON: Do any other teams in the production system
16 work on doors or door plugs besides the door team?

17 MS. LUND: There are two door teams. There's one who works
18 the back of the factory, one who works at the front of the
19 factory. The door mechanics and the door teams are the only ones
20 who work on the doors.

21 MR. JOHNSON: Are there, are there special qualifications or
22 training needed to be part of a door team, either on the beginning
23 or the end?

24 MS. LUND: Yes. And the training for those door mechanics is
25 provided as described earlier with the foundational training, and

1 then on the job training as well.

2 MR. JOHNSON: And that was true back in September of 23.

3 MS. LUND: Yes.

4 MR. JOHNSON: How many door team members were working in
5 Renton in September of 2023?

6 MS. LUND: I apologize, I do not have that exact number with
7 me.

8 MR. JOHNSON: Do you know how many managers there were for
9 the door team in 2023?

10 MS. LUND: I believe one, typically one or two. I believe
11 one.

12 MR. JOHNSON: What shifts do the personnel that work on door
13 teams typically work?

14 MS. LUND: They typically are a first shift operation in
15 Renton.

16 MR. JOHNSON: And what happens if you have a second shift
17 need for door work?

18 MS. LUND: If we have a second shift need and we know it, we
19 will sometimes ask a -- one of our trained mechanics if they can
20 stay over and complete it for us on second, or work with it on
21 second. If we do not have skilled labor, the job will be held
22 until the next day.

23 MR. JOHNSON: And in the previous panel you described the
24 Shipside Action Tracker process. A SAT record was created by
25 Boeing personnel to track a nonconformance record cited by the

1 Boeing quality in the early stages of productions on line 8789.
2 Can you please describe in detail the issues that led to the need
3 to open the MED plug rework?

4 MS. LUND: Yes, if I could go back to the timeline, I think
5 that is a helpful exhibit to answer this question. Great. I
6 might look up here, it's easier for me to read it, so let me know
7 if I am not near enough to the mic.

8 The five discrepant rivets were identified on September 1st
9 and the nonconformance was written. The holiday weekend came for
10 which three days passed. During the following week, Spirit came.
11 Is this what you would like me to walk through this process that
12 happened. Thank you.

13 MR. JOHNSON: Yes, please.

14 MS. LUND: Spirit initially conducted the rework on September
15 6th. The Wednesday of the following week. They applied the stamp
16 and CMES. After that, the Boeing inspector, as I mentioned, who
17 came back after Spirit completed their job, came back and found
18 the work to be unacceptable.

19 The Boeing inspector removed the Spirit stamp, which is what
20 happened at the end of September 6th. You will see they removed
21 it, and they requested again that Spirit come and appropriately,
22 completely rework the rivets.

23 On September 8th, Spirit replied in the system to that tag
24 that the rivets were acceptable as is, and did not need to be
25 removed and replaced, that they were compliant with the process

1 specification. On September 11th, Boeing quality reviewed that
2 again, and found that to be not true, that the rivets were not
3 conforming with our specification, and again removed those stamps.
4 And again, asked Spirit to rework the nonconforming rivets.

5 As we continued through the process, a few notable events.
6 On September 14th, you will see it was elevated to a tier two in
7 our SAT tracker. The tier level process is a process we use to
8 elevate issues on the factory floor. They get higher level
9 management attention. So when it gets elevated from a tier two,
10 it goes from just a local team level issue trying to work it, to a
11 level of management so that management can help reprioritize,
12 provide assistance to the floor.

13 So it was elevated to tier two, which is a senior level of
14 manager within the factory shop on September 14th. That is when
15 the conversation began about what is required for Spirit to gain
16 access to do a full removal and replacement of the rivets. You
17 can see that on September 15th, in the communication tool, the
18 Shipside Action tracker, it was decided that we would need to
19 remove the plug in order to have Access to those -- full access to
20 remove the rivets and reinstall them.

21 By September 17th, the work was still not complete, so the
22 SAT team elevated it to a tier three. That's an executive level
23 in the factory asking for help to get this work completed because
24 it needs to get done.

25 As you can see, sometime on September 18th the plug was

1 removed, and we know that because Spirit began their rework on
2 September 18th to remove and reinstall the rivets. That lasted
3 one extra day. It's a -- Spirit needed additional rivets. They
4 had drilled them out. They needed new rivets to finish the job.
5 They didn't have the ones they needed that day. So we went and
6 had those rivets brought down from our Everett location.

7 Those were available to them on September 19th, so they
8 reinstalled, replaced the discrepant rivets on September 19th.
9 And that is when the rivet job with new rivets was bought off by
10 both Spirit and Boeing.

11 MR. JOHNSON: I want to clarify one thing. The slide says
12 removed, but it was actually opened, not removed. Is that a true
13 statement?

14 MS. LUND: Yes. So in this case in -- I think we use both
15 words. The mid exit door plug has fittings, fittings on the
16 bottom of the plug. What we typically do is open it. So with the
17 fittings attached, the door rotates open and that is what
18 happened.

19 MR. JOHNSON: Thank you. Was the MED plug the pacing item
20 for 8789?

21 CHAIR HOMENDY: Sorry, can I -- can we just have just quick
22 clarification? Do you mean open the 15 degrees, or fully open?

23 MS. LUND: In this case, it was fully opened --

24 CHAIR HOMENDY: Thank you.

25 MS. LUND: -- so that it could lay flat.

1 CHAIR HOMENDY: Thanks.

2 MS. LUND: Virtually flat.

3 MR. JOHNSON: Was the MED plug, the left hand MED plug, the
4 pacing item for 8789.

5 MS. LUND: There were other statements of work still open at
6 the end of the line. Specifically, one of our more critical
7 statements of work that was still open was a wire bundle that
8 needed to be removed and replaced. That was a critical item
9 leading at the end of the line. And that job was complete on
10 September 18th.

11 So at the end of the day, Spirit, I believe, was -- haven't
12 checked this, but probably the last job that was complete prior to
13 the airplane rolling out.

14 MR. JOHNSON: Okay. Based on the SAT record, Boeing
15 personnel had confusion on whether the MED was a door or a plug,
16 and whether or not a removal needed to be generated to document
17 the opening of the door or plug. Why was there confusion around
18 this, I guess is what I'd like to understand.

19 MS. LUND: As I reviewed the transcripts, and of course not
20 being a part of it or knowing 100 percent, but as I reviewed the
21 SAT records and the correspondence. It seemed to me that the
22 team, what happens is we often say to a door mechanic, we need
23 someone to come down here and provide access.

24 We have multiple airplanes in our system at any time with
25 different configurations. I read this as just a conversation

1 around what is the configuration of this airplane. Is it a door
2 or is this a plug.

3 To add just a little bit more information to my testimony on
4 the first panel, there are doors and there are plugs. There is
5 also a deactivated door which is a sub-kind of a door. It's still
6 the door. Some doors actually open and close. Some are a door
7 that are deactivated.

8 So I read this as simply the employees asking which
9 configuration is this airplane that we need access to. Is this a
10 plug or is this a door. Meaning to me they had not been to the
11 airplane yet to go look at it. They were preparing. They were
12 getting the employees there. It becomes obvious when you go to
13 the airplane to look.

14 MR. JOHNSON: Are the production personnel at Renton trained
15 on the differences between models or sub-models, I guess was what
16 we called them earlier, so that they would know the difference
17 between a plug and a door.

18 MS. LUND: Yes.

19 MR. JOHNSON: Knowing that Boeing has a comprehensive
20 manufacturing process, were there other opportunities where the
21 rivets were -- or after the rivets were replaced, where the
22 missing vertical restraint bolts could have been caught?

23 MS. LUND: There are other opportunities where they could
24 have been caught, but they were not. The primary path would have
25 been the open paperwork, which we have said we don't believe

1 existed. It's not in CMES.

2 MR. JOHNSON: And to clarify, the date we have still found no
3 paperwork documenting the opening, or sorry, the removal of 8789's
4 left hand MED Plug.

5 MS. LUND: That is correct.

6 MR. JOHNSON: Mr. Cruz.

7 MR. CRUZ: Mr. Riney, during the investigation, the team
8 heard the term ship short. What is ship short?

9 MR. RINEY: So the term ship short refers to, if there is a
10 part that is not installed on the fuselage, or a Spirit provided
11 end item prior to shipping to Renton. It follows an established
12 process. The Boeing team must agree that they are willing to
13 accept that end item into their production with that part missing,
14 with the understanding that it will be, it will be provided at a
15 later date. At that time, Boeing would then create an out of
16 sequence IP to establish planning in their QMS for the
17 installation of that part that was shipped short from Wichita.

18 MR. CRUZ: Were there any items shipped shorted on fuselage
19 8789 when it left Wichita?

20 MR. RINEY: Not to my knowledge.

21 MR. CRUZ: So from your perspective, was there anything
22 unique about the repair on the five rivets of the forged edge
23 frame and the left-handed exit door on 8789?

24 MR. RINEY: Probably the only unique thing was that the
25 timeline of the identification of the rivets to the point of when

1 they were actually removed and replaced. Outside of that, it's
2 not a nonstandard repair to remove and replace rivets.

3 MR. CRUZ: So based out of the timeline that Boeing provided,
4 was there a Spirit and Boeing misunderstanding in the work that
5 was needed to be done?

6 MR. RINEY: I believe from the initial documentation, the
7 Spirit contractor incorrectly stamped what work was performed. In
8 follow up conversations with that individual, he stated that he
9 had confused that airplane with another airplane that he was
10 working on that day. He had stated that he had removed and
11 replaced them, when in actuality he did not, because he believed
12 that the rivets met the BAC 5004-1 specification.

13 When that was identified by the Boeing quality individual,
14 they had written a unauthorized rework pickup because the
15 incorrect information was identified on the original pickup. And
16 at that point, the mechanic working with the Spirit contract
17 manager, at that point, stated that they had believed that the
18 rivets met the BAC 5004-1 specification.

19 In the Boeing timeline, this is also shown, and that's where
20 the disagreement with the Boeing QA was identified. And then they
21 in turn rejected Spirit's statement, and requested the rivets be
22 removed and replaced. At that time, that's when the team
23 identified to Boeing that to access those rivets, the MED plug
24 would need to be opened.

25 At the current configuration, there was only access to the

1 tail side. The head of the rivet would be in the seal retainer on
2 the, on the door edge frame, and that's where we would need access
3 to drill out the fastener.

4 MR. CRUZ: And for the record, did Spirit personnel open and
5 close the left hand mid exit door plug prior to and after
6 accomplishing the rivet replacement?

7 MR. RINEY: No. None of the Spirit contractors have any
8 training in how to perform that work. And we request that if they
9 are not trained, that they do not perform any work. And at that
10 point we have always taken the position to request Boeing
11 assistance for opening of doors for access.

12 MR. CRUZ: Please bring up Exhibit 11, Exhibit 11E,
13 attachment four, page 3, please.

14 So during the -- this is for Ms. Lund. During the
15 investigation, Boeing provided a list of 62 other cases since 2019
16 where there was, there was a removal documentation created for the
17 mid exit door plug while the airplane was in production, or on the
18 flight line. What is the difference, if any, between these 62
19 cases versus the lack of documentation on 8789?

20 MS. LUND: Other than the lack of documentation, I'm not
21 aware of what the difference is. Per the BPI that we've been
22 referencing, removals should have been written per process, for
23 the removal of the MED plug. These are examples where it needed
24 to be opened. Perhaps the difference is the reason it needed to
25 be opened, but nonetheless it needed to be opened. And in these

1 cases, a removal was written.

2 MR. CRUZ: Based on the previous answers to questions on who
3 is allowed to work on the mid exit door plugs, the door crew
4 members working only on the day shift, and knowing no, no door
5 crew member worked on the second shift on September 19th, what
6 Boeing production plan or process was in place should a door crew
7 member be needed to complete a plug or door related work on an off
8 shift?

9 MS. LUND: The plan would have been to have a door member
10 stay over, as I mentioned. That was not done. So the door would
11 have needed to been officially closed by a door member, which
12 would have been the next day. This is a point to open up into
13 what we believe happened that evening. And that is when an
14 airplane prepares to roll out of our factory, a -- we call them
15 the move crew. I believe their team name is the Aviators, but we
16 call them the move crew, comes in and prepares an aircraft to move
17 outside.

18 Their fundamental job is to prepare it for the elements, to
19 close the doors, to close the engine cowl, protect it if there's
20 an open space on the airplane, protect it from the elements. And
21 in this case, the move crew says that they believe that they
22 pushed the door two, not intending to firmly reinstall it, but
23 simply to prepare the airplane to be ready to move outside.

24 MR. CRUZ: Mr. Johnson.

25 MR. JOHNSON: Mr. Riney, after assessing the issues related

1 to this event on 8789, were there any changes instituted in the
2 Spirit supplier assist process for Spirit personnel to prevent
3 this type of thing from occurring in the future?

4 MR. RINEY: So for our team, again, as was mentioned earlier,
5 there were specific changes that Boeing had instituted. They
6 removed the Spirit quality team members, contractors. There was
7 also, as Ms. Lund mentioned earlier, an assessment performed of
8 the Spirit on site contract mechanics.

9 That assessment took place in January, and at that point the
10 individuals that passed the assessment were returned to the shop
11 floor. There's been an increased level of engagement with the
12 Boeing operations team, specifically with a operations leader
13 working closely with our team, along with their Boeing operations
14 peer counterparts to ensure that the work gets accomplished as
15 early in the process as possible.

16 MR. JOHNSON: Thank you.

17 Ms. Lund, what safety actions has Boeing instituted to ensure
18 that unauthorized removals do not occur in the future?

19 MS. LUND: We, shortly after the accident, put out the
20 documentation virtually immediately. That was the read and sign,
21 ensuring that every employee had access to these removals and then
22 signed that they understood the removal process. So that action
23 was taken shortly after the accident.

24 We then revised the process, as was discussed briefly in the
25 previous panel, where we have initially made it a team lead and

1 then trained employees to initiate the removal. We also added
2 back in the okay to remove quality inspection up front, as we look
3 through the removals to help us through this process as well.

4 As it comes to the mid exit door, we have implemented several
5 changes, but the most visible is the day the fuselage arrives in
6 our factory, we have a laminated blue and yellow tag that we hang
7 on the mid exit door plug. And in relatively large font, it says
8 do not open. And in smaller font it says without contacting
9 quality assurance.

10 That tag goes on the MED plug the day it arrives, and it
11 stays on until the end of the process when we are putting the
12 airplane up for its final customer inspection. It comes off for
13 the flight and gets reinstalled, but fundamentally it stays there
14 through our entire production process.

15 And so we've added that visual for the MED plug so there can
16 be no question that it needs a removal and what is to happen prior
17 to removing it. We've strengthen the removal process. We've
18 improved our training for the removal process, and we are
19 continuing to work through the actions of that SRM on the removal
20 process that we mentioned earlier.

21 MR. JOHNSON: Okay. One follow up from before. We, when we
22 talked about -- when I asked you about the slide saying removed
23 versus opened.

24 MS. LUND: Yeah.

25 MR. JOHNSON: So the left hand MED plug remains -- remained

1 hinged at the bottom, was disengaged from the track. Was -- the
2 lanyards were unclipped, and the door was laid open on to a stand
3 at approximately 90 degrees but remained hinged at the bottom
4 attached to the aircraft. Is that correct?

5 MS. LUND: That correct.

6 MR. JOHNSON: All right. What actions have been taken to
7 ensure that removals are written to the highest possible standard?
8 I know you kind of answered that, but I really want to punch this
9 home because I think it's important.

10 MS. LUND: Thanks. That is why we've required people to pass
11 this training prior to being able to write the removal. One of
12 the items that the NTSB has noted, and we noted as well, is that
13 in looking at the consistency of our written removals, they are
14 not the level of consistent that we would like.

15 When they're there, there's not the level of proficiency and
16 consistency in writing it. So that's why we've improved the
17 training. And then we did that. That's why we put the assessment
18 process in there, to make sure that before someone can write a
19 removal, they can pass an assessment about what should be in a
20 removal, what's the right process, what's it mean that there's a
21 level of proficiency, and that.

22 As well as the quality okay to remove. The quality inspector
23 now also we'll look at that paperwork and make sure that it's
24 right, and we're good to go, before we start removing things from
25 the airplane. So those are the primary two steps to address that

1 very issue.

2 MR. JOHNSON: Thank you. That concludes the questions from
3 the technical panel.

4 Mr. Brazy, back to you.

5 MR. BRAZY: Madam Chair.

6 CHAIR HOMENDY: Great. Thank you. We're going to start with
7 questions from the parties, and same process, and we will start
8 with ALPA.

9 CAPT JANGELIS: Thank you, Madam Chair.

10 Our question is of Boeing. How many of the Max post
11 accidents MED plug inspections revealed problems with the original
12 MED installation?

13 MS. LUND: I don't have that data on me, that started with
14 the original MED plug installation. I don't know that answer.

15 CAPT JANGELIS: Okay. Have any of your customers reported
16 737-900ER MED plug installation faults during heavy inspections?
17 If it's the same door as previously testified.

18 MS. LUND: Not that I am aware of. I do know that when we
19 went out and did the inspections after the accident, we included
20 the 900ER in those inspections and we found some of the similar
21 issues on the 900ER that we had on the Max. But that is not the
22 same as a heavy inspection to your exact question.

23 CAPT JANGELIS: We are aware of multiple MED plug
24 installation irregularities discovered during the post accident
25 Max grounding inspections, as you previously pointed out,

1 including the right hand MED plug of the accident aircraft. We'd
2 like to know what Boeing is doing to ensure that they and their
3 suppliers are providing a defect free aircraft to the traveling
4 public.

5 MS. LUND: Thank you. As a result of our findings, that is,
6 that is why we've taken many of the steps that we have taken. So
7 first, earlier in panel one, both Doug, my colleague from Boeing,
8 and Spirit, discussed the enhanced inspections at Spirit involving
9 the plug.

10 The oversight of the inspections, the end of line
11 inspections, and then when it comes to Boeing, we are doing
12 additional inspections of those mid exit plugs as well. At the
13 end of line, we operate what we called the MOM. MOM stands for a
14 multi operator message. This MOM was put out after the accident
15 for the fleet to all go reinspect their door, open it, make sure
16 it's all good. Everything's good.

17 We do that on every aircraft now at the end of our production
18 system. So we still implement that final inspection to ensure
19 that the mid exit door plug is good. In terms of the other
20 findings and discrepancies that were found, those are the ones
21 that we have worked back one by one.

22 This is why we've implemented our in process inspections.
23 We've implemented all of these potential issues that we saw, the
24 real issues we saw in the fleet that could potentially happen
25 again. And those are in our end of line inspections that we now

1 check for at Spirit as well. We've worked them back, we've added
2 inspections at Spirit trying to come -- to ensure that we don't
3 find any of those same issues again.

4 CAPT JANGELIS: Thank you.

5 My next question is for Spirit. From the NTSB manufacturing
6 records report, there were 26 Spirit AeroSystems personnel
7 employed at the Boeing Assembly facility, including two quality
8 assurance personnel that did not recognize the fault with the
9 rivets. From the first nonconformance record, the rivets were
10 painted over and not repaired, resulting in a second
11 nonconformance record. Were none of these employees at Boeing
12 trained to inspect rivets, identified damaged rivets, and repair
13 these rivets properly?

14 MR. RINEY: Yes. As I previously mentioned, the Spirit
15 mechanic made, the contractor mechanic, made an error in the
16 statement that he had applied to the initial inspection. Or
17 excuse me, the initial documentation. The spirit quality
18 assurance contractor, they will normally work right alongside the
19 mechanics.

20 I believe that that error transferred over into the
21 application of the stamp on the inspector's part as well. The --
22 reviewing the, I think if you, if you wanted to pull up one of the
23 images. I think it's 11C, page 13. That does show one of the
24 rivets painted.

25 Based on the discussion with the mechanics, I believe they

1 felt the rivets were acceptable. That may have required removal
2 of paint or the secondary primer application. And then to reapply
3 paint. And then that's why they then stated on the Boeing's
4 unauthorized rework pickup that they believe that the rivets met
5 the requirements.

6 I think that's image three. I think I was referring to image
7 four, but yeah. So that's why -- that -- based on that image,
8 that's why I believe that felt the rivets -- and that's a number
9 five rivet, that's a very small rivet. So you're looking at a
10 blown up image. But that's why I believe that they felt that the
11 rivet tails were acceptable.

12 And why they then applied that information on the
13 unauthorized rework pickup. But they are -- the training for the
14 inspectors that is completed by the Spirit Wichita trainer would
15 also go over these types of inspection, the BAC 5004-1-2, you
16 know, for fastener installation.

17 CAPT JANGELIS: Final question. Are the mechanics and the QA
18 inspector not independent?

19 MR. RINEY: How do you mean?

20 CAPT JANGELIS: Are they the same employee line, same, you
21 know, they both approved the same piece of work. Are they
22 independent? Do they belong to a different department, group, or
23 are they sitting next to each other?

24 MR. RINEY: They are --

25 CAPT JANGELIS: Signing off the same, the same item.

1 MR. RINEY: They have a Spirit area within the Boeing factory
2 that they work out of. But the Spirit contract mechanic is only
3 able to stamp off on the contract -- or the excuse me, the
4 mechanic operations, and the spirit QA, it is, at the time, was
5 only able to stamp off on the QA operations. And it identified
6 their stamps independently within the Boeing CMES system.

7 CAPT JANGELIS: Thank you. No further questions.

8 CHAIR HOMENDY: Thank you. We will now go to Alaska
9 Airlines.

10 MR. TIDWELL: Thank you, Chair Homendy.

11 A couple of questions for clarity. We talked about the
12 initial rig, Spirit. And not necessarily having training but
13 looking at fit and flush. And now we're in the Boeing factory.
14 We talked about the final fit. So Ms. Lund, what flow day is that
15 final fit done by, and who is it done by?

16 MS. LUND: There are two final -- there are two times we
17 check it in our factory. The final one is obviously the latter,
18 but there are some things we check for the final time earlier. In
19 flow day one or two, we do the rig check of the fuselage. We
20 check it on the outside of the fuselage and the inside of the
21 fuselage.

22 That is done by our door crew. The airplane then proceeds
23 down the line and becomes an airplane. It gets the weight on
24 wheels, as Mr. Riney referenced. It flows down the process and on
25 flow day nine, the next to the last day in our factory, we do the

1 final fit and fair, and that is an external only check.

2 So our final internal rig check for gaps et cetera, is done
3 in the structures tool up front. The final fit and fair check on
4 the exterior that we check after the weight on wheels, is done in
5 flow day nine, both by our door experts.

6 MR. TIDWELL: Thank you. And both of those are also pressure
7 checks. Right?

8 MS. LUND: The --

9 MR. TIDWELL: Flow day nine?

10 MS. LUND: The pressure check is actually done on flow day
11 seven, I believe. Pressure testing, that is where we pressurize
12 the aircraft. We want to do that final check after the pressure
13 testing to make sure that it's not moved and when it's seated or
14 pressurized. So our final -- our pressure check of the aircraft
15 is done on flow day seven, prior to our final external check on
16 flow day nine.

17 MR. TIDWELL: I appreciate that. That's good information.
18 On flow day nine as we do this check, if we find some additional
19 rigging that needs to happen, is that going to be my door crew or
20 is that another workforce?

21 MS. LUND: Your door experts again, your door crew.

22 MR. TIDWELL: Okay. Thank you.

23 Mr. Riney, you talked about Puget Sound area having some
24 great technical experts to bring in as contractors. I agree with
25 that. A great place to be. Are most of these previous Boeing

1 employees?

2 MR. RINEY: They can be, or they can also, I think this is
3 what we've seen after COVID, there's been an increased number of
4 whether retirees from Boeing, or even retirees from Spirit that
5 have gone to contracting. And so that's where we can then pull
6 from for immediate highly skilled individuals to get into our
7 workforce in Renton quickly.

8 MR. TIDWELL: I think that's great to use that resource. Is
9 your training solid enough to let them know that the role has
10 changed? And their -- the tribal knowledge, as you might say, of
11 process has changed as a contractor for Spirit?

12 MR. RINEY: So I don't believe that we deal with tribal
13 knowledge in our specific situation in Renton, because it is
14 strictly focused around rework. So with the, you know, the
15 majority of our team specializing in fastener removal and
16 replacement, or some small structure replacement, or tool mark
17 blends, that type of thing. It's not something that I believe
18 lends itself to tribal knowledge, but more hands on experience.

19 MR. TIDWELL: Okay. Thank you. Appreciate that. No further
20 questions.

21 CHAIR HOMENDY: Thank you. We're going to take a ten minute
22 break and come back and start with the Association of Flight
23 Attendants.

24 CHAIR HOMENDY: How we doing? Ready to go? All right. We
25 have a couple of clarifications that the technical panel wants to

1 ask about before we go to the Association of Flight Attendants.
2 So technical panel.

3 MR. JOHNSON: Ms. Lund, why do you say that the move crew
4 closed the left hand MED plug on 8789.

5 MS. LUND: I said that we think, we don't know definitively.
6 My understanding in reviewing the transcripts and the interviews
7 with the move crew, they have stated that they believe they pushed
8 the door two.

9 MR. JOHNSON: To clarify on that. That was part of those
10 interviews.

11 MS. LUND: Yes.

12 MR. JOHNSON: The timing for when they actually pulled the
13 plug, he said he left a gap, was actually the 18th. So it was the
14 evening of the 18th when they needed to get weight on wheels so
15 that they could set the height of the struts, and they had to move
16 the stand away from the MED plug door in order to put weight on
17 wheels.

18 So they had to get the stand away, and in order to get the
19 stand away, they had to support the left hand MED plug off of the
20 stand. And then I'll call it almost closed position. And I, and
21 I came to the same conclusion you did initially.

22 And then when we went through with the timing, it actually
23 turns out it was on the night of the 18th, and not on the night of
24 the 19th. So the transcript does talk about him saying that he
25 pulled it almost closed. And that is, that is part of the docket,

1 and that is available.

2 But it happened on the 18th and not the 19th, and we have no
3 knowledge, and I hope if you have knowledge please share it. We
4 have no knowledge of who closed the plug on the 19th. And I want
5 to understand if you know something that I don't.

6 MS. LUND: I do not have any knowledge beyond what you
7 described. I will certainly go back and review those exact dates,
8 but I don't have knowledge beyond what the interviews that you
9 just described as well.

10 MR. JOHNSON: Okay. Thank you.

11 CHAIR HOMENDY: Thank you. I think the transcripts show that
12 it was reopened. That it -- that at some point it was closed, but
13 not totally closed on the 18th, and would have been reopened.

14 MS. LUND: Reopened on the 19th to complete the rivet rework
15 right.

16 CHAIR HOMENDY: Right.

17 MR. JOHNSON: That that is correct and --

18 MS. LUND: Yes.

19 MR. JOHNSON: -- on the 19th, the rivet rework was done, and
20 completed by roughly 6:30 in the evening.

21 MS. LUND: Correct.

22 MR. JOHNSON: And all of that happened well after the weight
23 was put back on wheels, and the door had to be reopened in order
24 to do that. So thank you.

1 MS. LUND: Correct. I agree with my reading of that as well.
2 Yes.

3 CHAIR HOMENDY: Great.

4 MS. LUND: Thank you.

5 CHAIR HOMENDY: Thank you very much. AFA.
6 Mr. Heiple.

7 MR. HEIPLE: Just a clarification on the inspection of the
8 door bolts, not necessarily specific to this aircraft, but after
9 the aircraft is delivered by Spirit to Boeing, are the bolts
10 inspected prior to them being covered if there's no rework done?
11 Or is it --

12 MS. LUND: Pre, pre accident, in September, they would have
13 been reviewed and inspected in two portions. Number one is the
14 rigging area where they're looking exactly at that part of the
15 plug. I believe it would be noticed during that rigging if
16 something was not right with the door on the inside.

17 The second portion during that same time as described very
18 nicely by Mr. Catlin earlier, when we call it okay to close, there
19 is an okay to close effort also done upon a removal of the
20 airplane. That's how it was done then. Now we have a specific
21 review for the bolts themselves and the plug.

22 MR. HEIPLE: Thank you for that review. And if you can
23 entertain just another question about lubricant, does Boeing
24 provide guidance to operators and contract maintenance for what
25 lubricant to use when closing the MED door plug after maintenance

1 for the Max-9, and the 737-900-ER?

2 MS. LUND: I've not checked the maintenance document for that
3 specifically, and so I cannot answer that specific question.

4 MR. HEIPLE: Okay. And then to both of you, there seemed to
5 be a bit of a discrepancy about the labor market in Northwest
6 Washington. Boeing described a dearth of qualified candidates and
7 Spirit describes a surplus. And is that just a different in
8 qualifications that you're looking for or can you help us
9 understand?

10 MR. RINEY: So for Spirit, what I described was after COVID
11 there was an increase in the availability of contractors. It
12 appeared that either retirees from Boeing or MRO's, or that type
13 of thing in the area, would allow us to quickly pull those types
14 of resources. I can't speak to those seeking full-time employment
15 direct to Boeing though.

16 MS. LUND: Which is what all of our jobs are. They are full
17 time IAM represented hourly employees in the Puget Sound. And so
18 it would potentially, I don't know, but potentially not
19 necessarily be the exact same people who want to come work
20 permanently versus a contractor.

21 MR. HEIPLE: Thank you. No more questions.

22 CHAIR HOMENDY: Thank you very much.

23 Mr. Gerlach.

24 MR. GERLACH: Thank you, Chair.

25 Two questions. The first one, when the FAA issued the

1 Airworthiness Directive that referenced the MOM, did you all go
2 back and perform that AD on the production airplanes in the
3 factory?

4 MS. LUND: Yes, we did.

5 MR. GERLACH: And then the next question that I have for you,
6 there was a Boeing employee, a team lead, door team lead, he
7 stated that we do not open and close these door plugs. It's not
8 something that we do. Did you mean to say that there's a
9 different door team that does that, and not this particular one?
10 It's in the transcripts. One of the interviews.

11 MS. LUND: I would need to go back and reference exactly what
12 he says. It is not their baseline statement of work to open and
13 close it. That is a true statement for sure, as we've mentioned.
14 If the rig is correct and it holds, nothing happens through
15 transportation or the build of the aircraft on most airplanes, and
16 you've seen this as well, the door -- the plug does not need to be
17 opened.

18 But there are occasions where it needs to be opened and I
19 believe that the door crew is responsible for opening the plug in
20 the case that it needs to be opened, not baseline work, but when
21 it needs to be opened.

22 MR. GERLACH: And in his transcripts in the interview, it
23 says that he referenced AOG and SST as being responsible for
24 opening and closing the door plug.

25 MS. LUND: Our AOG and SST mechanics are, it's a group of

1 highly trained mechanics. Our AOG team obviously is the team we
2 send out on the road when an aircraft is AOG or when we need a
3 highly skilled group of employees that can do multiskilled work
4 function out on the road, including some of the door crews.

5 SST is a similar group to that. Maybe not quite as highly
6 skilled as broadly as AOG, but very highly skilled. We pull them
7 from experienced mechanics. And so we, with the right training,
8 can use AOG and SST to do those skills as well.

9 We pull SST and AOG in to do what I'll call non-baseline work
10 frequently, in order to allow our actual employees to stay on the
11 job. So I do know that we use AOG and SST. As you can imagine,
12 AOG is not always available. Sometimes they are. SST is usually
13 more available sometimes but depending on their workload as well.
14 But I do believe those employees are capable of doing it.

15 MR. GERLACH: Right. So in all likelihood, they would have
16 been the appropriate organization to go to, to have it opened and
17 closed.

18 MS. LUND: We could have called them.

19 MR. GERLACH: Okay.

20 MS. LUND: Appropriately, yes.

21 MR. GERLACH: Thank you very much. Chair, that's all the
22 questions I have.

23 CHAIR HOMENDY: Thank you very much. Machinist.

24 MR. HOLDEN: Thank you, Madam Chair.

1 This question is for Ms. Lund. So we do see through the SAT
2 data that there was confusion about the removal process on line
3 8789. My question is about the okay to install the blankets. Is
4 it clear to Boeing that the okay to install the blankets that was
5 complete and then had to be opened would have required a removal
6 as well?

7 MS. LUND: Clarification on my review of the data, my review
8 of the data showed that when we did the okay to install the
9 blankets, that it was complete less. Stamped by the mechanic and
10 the inspector, complete less the area around the plug where the
11 NCR was.

12 So it was not stamped off complete. It was complete less,
13 that area, which is a process, as you know, John, that we were
14 allowed to do, so that the rest of the work in the area can
15 continue. But the final stamp doesn't get applied until that
16 final work gets done. And I believe that in the case of this
17 airplane, it was complete less by manufacturing and quality in
18 that area.

19 MR. HOLDEN: Our evaluation showed that the blanket install
20 was stamped complete on 9/1, even though the fasteners had to
21 continue to be worked. And maybe that needs to be looked at.

22 MS. LUND: I think it does. Just as a point of reference
23 when we went out at lunch, and I heard this conversation, I had
24 the team go look again. We believe it's complete less. We should
25 go look at that and get clear on that.

1 MR. HOLDEN: Okay. When earlier there was discussion around
2 removal or opening of the MED plug, is that terminology, is that
3 -- do you believe that terminology to open or to remove that, you
4 said it was interchangeable.

5 MS. LUND: I have heard both. I have heard both. I believe
6 we have heard removal because there are parts that are needed, or
7 removal is needed. The opening because the bottom can still be
8 there. There's clearly the option to actually remove the entire
9 plug itself. That was not done. I have heard people use both.

10 MR. HOLDEN: I've heard you mentioned your company is working
11 on, you know, training and other corrective actions to solve these
12 issues in the future. Because there was SAT traffic with
13 management and other salaried folks in the LSCC on whether a
14 removal was required, was some of that corrective action or
15 training also being provided for management.

16 MS. LUND: Yes.

17 MR. HOLDEN: Can you elaborate on that?

18 MS. LUND: We have as a part of our improvement activities
19 there is a training for our first level managers, first, second,
20 and third level managers, both, and a portion of that is
21 leadership training that we're doing a great deal on it, and a
22 part of that is technical training, including the technical
23 aspects of our policies and procedures to reinforce and train on
24 those very issues as well.

25 MR. HOLDEN: Thank you.

1 This question is for Mr. Riney. When you were speaking about
2 receiving products supplied by a supplier with source delegated
3 inspection, what is the inspection process that you use, that
4 Spirit uses to receive parts or assemblies from a supplier with
5 source delegated inspection?

6 MR. RINEY: Yeah. So normally that will entail as part of
7 the receivable process, inspection of the paperwork to ensure that
8 the parts shipped aligned with the parts being delivered, along
9 with a visual inspection to ensure no damage occurred during
10 shipping. But that's the extent of the inspection. There's -- we
11 don't conform the incoming product.

12 MR. HOLDEN: Okay. I would ask Ms. Lund the same. On parts
13 or assemblies that are brought in from the supply chain from a
14 supplier with source delegated inspection authority, what kind of
15 inspections are in place for receiving and what process -- do you
16 know what process is used to complete that inspection?

17 MS. LUND: If it is source delegated with no probation or any
18 other kinds of corrective actions coming from the Boeing company,
19 my expectation would be that the inspection is done at the
20 supplier and then we will do an initial receiving inspection.
21 When it arrives at Boeing, be it certainly an ID and damage, and
22 an initial visual inspection of parts when they arrive.

23 And then of course there's the oversight process we talked
24 about with things evaluated as possible. That of course, does not
25 necessarily apply to a Spirit, as we discussed earlier with --

1 that -- it's just such a large supplier, it's a little bit
2 different.

3 MR. HOLDEN: And is it different because you're had many
4 defects that you were aware of and trying to work the track down?

5 MS. LUND: Yes. And we had been working it, as was discussed
6 earlier with Spirit, we had increased our presence, and we had
7 increased our oversight. So yes, due to that, certainly since the
8 accident. But and it's always been a little different with
9 Spirit, they obviously provide -- they are our largest supplier by
10 far. They provide the entire fuselage.

11 The amount of work that's done is very large and we have
12 always had some permanent on site presence at Spirit, which we do
13 not everywhere.

14 MR. HOLDEN: Thank you. No further questions.

15 CHAIR HOMENDY: Thank you. Ms. Meyer with Spirit
16 AeroSystems.

17 MS. MEYER: So this question is for Mr. Riney. So is there
18 -- are there cases, Mr. Riney, where Spirit and Boeing disagree on
19 what a defect is?

20 MR. RINEY: Yes. I don't believe that's uncommon. There are
21 certainly some of the defect write ups that we see, they might not
22 be completely clear, may not have all the details of the
23 specification. And after investigation by our team, determine
24 that the items do meet the specification. And then we were able
25 to show where in the spec that they would meet that.

1 And it does go both ways, though. There are some items that
2 we agree on, and then there are some items that we just don't end
3 up agreeing on.

4 MS. MEYER: So can you give me some examples of those type of
5 items where we might not agree on what a defect is?

6 MR. RINEY: One specific one, you know, like we showed in the
7 photo, you know, it could be actually a cosmetic defect that's not
8 bit form and function-wise, it doesn't actually detract from the
9 installation. And if there's not specific measurements included
10 in the write up, that type of information could be the -- whether
11 the defect is a true defect or not.

12 MS. MEYER: So in Renton, the -- if there's a disagreement
13 that we can't meet resolution, who's the final decision maker in
14 the Boeing quality system?

15 MR. RINEY: As you mentioned, because it is Boeing's QMS,
16 they have final say on whether the item gets worked or not.

17 MS. MEYER: Okay. Thank you. That's all for now.

18 CHAIR HOMENDY: Thank you, Captain Jangelis.

19 CAPT JANGELIS: Thank you, Madam Chair.

20 This question is for Ms. Lund. During the investigation it
21 was discussed how common the removal of the plug is. How often
22 our mid exit door plugs removed from an aircraft?

23 MS. LUND: In the production system?

24 CAPT JANGELIS: Yes.

1 MS. LUND: The 62 times where the number of times that we
2 found. It is not what I would call normal. That is not a large
3 number of instances. And so only when there is a reason that is
4 out of the normal. Most airplanes will not have that mid exit
5 door plug opened.

6 And then in maintenance, it's opened as a -- after a number
7 of years to check the structure under a major structural check,
8 but not frequently there either.

9 MR. JENGELIS: And thank you. When we're installing the mid
10 exit door, can you reinstall the old and removed hardware? Or is
11 it a new set of unused parts and are those required?

12 MS. LUND: In terms of the bolts themselves, we've had this
13 discussion. In order to reinstall the previous bolts, they would
14 need to be conforming with no issues, no defects, no signs of wear
15 of the previous installation.

16 When we were doing our MOM in production and continue to, we
17 have been using new hardware. We had the conversation if it
18 previous existing hardware could be used, and the answer that I
19 received is if it was fully conforming with no defects and exactly
20 the right part, it could have been reused, but we were installing
21 new parts in that case.

22 MR. JENGELIS: Is it different on the assembly line versus on
23 the ramp? And what verification process are mechanics using to
24 keep track of removed parts and ensure that all parts get
25 reinstalled?

1 MS. LUND: Our processes are the same in the manufacturing
2 system and on the ramp. The primary difference would be on the
3 ramp, typically, more parts are installed, and you may have to
4 remove more parts, obviously. In the build maybe something's not
5 covered up. It hasn't already been built out on the ramp. If you
6 need to access something, removals may be more frequent.

7 The process is the same. The BPI is the same. The process
8 is the same. When parts are removed, they should be removed.
9 There should be paperwork with them, and placed on a work in
10 process rack, which is where they are housed. In, again, I will
11 talk about the way it was in September of 2023.

12 The parts were labeled to go on the rack. There is a
13 required tag that has to go on it that has the part number, and
14 the IP number, and the employees name who's working on the job or
15 is taking them off. And then put on the rack appropriately.

16 In our improvement activities, we are in the process of
17 rolling out, and have done it across one line in the 37 factory
18 and our now expanding, a more electronic bar chart type system
19 that keeps that track of those parts more electronically, allows
20 us to know exactly where the parts are, and better traceability
21 and compliance to filling out the paperwork with those parts as
22 well. So that's one of the improvements we have made.

23 MR. JENGELIS: For better parts tracking, is there a task
24 card specific to the removal and reinstallation of the mid exit

1 door that the Boeing door team would have available to them that
2 details all the steps required perform the task?

3 MS. LUND: When a removal is needed, there will be steps or
4 if required, what those steps are to remove them. Engineering can
5 provide that, manufacturing engineering can provide that if it's
6 required to do that as part of the removal documentation.

7 One of the complexities of our removal system is, and this
8 came up sometimes, there are two forms. There's a long form and a
9 short form. Things that need retesting that need questions from
10 engineering, that need a lot of instructions, those go on the long
11 form. And that is the kind of material that is provided on that
12 form.

13 The short form is something that would be very simple. Say a
14 ceiling panel could be removed and then reinstalled without a
15 retest. A seat bottom cushion, although that's an exempt one, but
16 something that could be very simple to install or reinstall
17 without a full retest or engineering statement of work.

18 MR. JENGELIS: So to confirm my last question, task card,
19 meaning a list, a checklist of items that they do when they do
20 work with the door, is -- it's not based on mechanic knowledge or
21 experience. There is a list of steps to do this process.

22 MS. LUND: My understanding is, and I need to validate this,
23 but that that is provided to the mechanic for items on the long
24 form, particularly, yes, such as the plug.

25 MR. JENGELIS: Thank you. No further questions.

1 CHAIR HOMENDY: Thank you, Alaska.

2 Mr. Tidwell.

3 MR. TIDWELL: Thank you, Chair.

4 A couple of quick questions. Ms. Lund, can you talk me
5 through the tier one, two, three review process? And let's get
6 specific to the status, or what would have been elevated with the
7 door removal, and how it was resolved, and was it resolved at the
8 right level in the process as it was defined then. Is that
9 process the same today?

10 MS. LUND: The tier one, two, and three, We have actual team
11 meetings at the start of shift. Tier one is really the meeting
12 between a manager and their crew. It's the start of shift crew
13 meeting. You talk about what you need, what's going on in your
14 crew. That's the baseline.

15 Every day on first and second shift, there is then an
16 escalating level of tiers. There is a meeting where the first
17 levels meet with their senior manager. There's a meeting where
18 the senior managers and executives meet across the factory. And
19 then there's a tier four where it gets elevated to the highest
20 level executives on the program.

21 Mostly things get worked at the team meeting. When they go
22 to a tier two, an example of something that would go to a tier two
23 is if an employee in flow day six needs help from an employee in
24 flow day three, at the tier two, they would get together and say

1 hey, I need your guy from flow day three to come down here and
2 help me do this work. And they would talk about the priority.

3 So the people down line would say, yep, I'll prioritize
4 somebody, get it down there to you. And so what happened in this
5 case is it wasn't getting done. Mike attends some of our tier
6 meetings. I've been at many a tier meeting with Mike, and if
7 there is a Spirit item that's been elevated for help and we need
8 help, we often say to Mike at the tier meeting, Mike, we need you
9 to reprioritize this. We, you know, need somebody working on this
10 job today.

11 And so the tier meeting is effective in that way. It's a
12 communication tool. If something is lingering, it allows
13 management visibility to get it done. So in that way, our tier
14 meetings continue and they're an important way of communicating
15 across our factory.

16 The part that that did not work well is just how long it took
17 to get this issue resolved. We've talked about the back and forth
18 between whether the initial -- the middles were acceptable to
19 Boeing. Mike is right. It is ultimately a Boeing call. It was
20 not acceptable to Boeing. That went on too long. We talked about
21 that and are in agreement that it can't last that long.

22 But once we got to the tier two and three, I think the tier
23 two was on a Friday, the tier three was Sunday. The work started
24 and started moving, that part in getting help started to move. We

1 need these things to not drag out that long. That part was not
2 successful. It didn't work well.

3 MR. TIDWELL: Okay, thank you.

4 Mr. Riney, do you have any different perspective on that?

5 MR. RINEY: No. I think when things are elevated and as
6 Ms. Lund spoke to, I do attend those meetings when there are help
7 needed requests. The only issue for us is we always will look to
8 help from -- while we may be asked for help, we will, in turn,
9 always be asking for help from Boeing if there's a access or that
10 type of thing that's needed.

11 MR. TIDWELL: Okay, great. Thank you. One more thing on the
12 lock out tag out program, it truly is a safety program. Knowing
13 who's on the barge or whatever their position is. It seemed like
14 there was some different perceptions on how that process is used
15 on the floor. Is this something that you audit or you're able to
16 take a look at and see what the compliance rate is from a safety
17 perspective? Not necessarily what are the, what are the
18 technicians. Truly a safety perspective. Is that being
19 reviewed?

20 MS. LUND: It is being reviewed and that's one of the -- it's
21 being reviewed. The role that I talked about earlier called a GC
22 is the person who helps us control this on each aircraft. We are
23 looking at the GC project process. I will tell you it's stronger
24 right now in Everett than it is in Renton. We're retraining.
25 We're strengthening across all locations.

1 But particularly in Renton, we've gone back to the
2 documentation, and we are conducting audits. We're conducting
3 compliance audits on the factory floor to ensure that we are
4 complying with that LOTO program. That LOTO program, to your
5 point, is safety. It is the key of keeping our employees safe and
6 we're really passionate about making sure that the airplane safe
7 before we have people work on it.

8 MR. TIDWELL: Okay, thank you. No further questions.

9 CHAIR HOMENDY: Thank you very much AFA.

10 MR. HEIPLE: Thank you, Chair.

11 Ms. Lund, you talked about concerns being elevated to
12 management, tiers two and three, via the SAT. Can you help us
13 understand why CMES isn't also used to document those concerns?
14 And SAT is described as a communication tool primarily.

15 MS. LUND: CMES is the system where the work is documented
16 on. So anytime we work on an installation plan, a rejection tag,
17 that is in CMES, that's the system that shows what work was done
18 on the airplane, the employees that did it, that it was complete,
19 that our jobs are complete, that our airplane was built complete.

20 In terms of saying, hey, this is a priority, could you get
21 somebody down here. That is what we use the SAT system for,
22 because that is the communication. It's not the record that I did
23 it, but saying I -- this has really turned hot. I need somebody
24 down here, or I found something, and I need somebody who has the
25 skill that resides back in a different part of the factory. And

1 so it's just, it's the way we ask for help, or talk about the
2 communication when we find something.

3 Where a CMES is really the record of the work that was done
4 on the airplane, maybe not the ask for help that came, but the
5 work that was done on an airplane. That that's the way the systems
6 are set up.

7 MR. HEIPLE: Thanks for the clarification. No more
8 questions, Chair.

9 CHAIR HOMENDY: Thank you very much. FAA.

10 MR. GERLACH: Thank you, Chair.

11 So going back to my previous questions about AOG and SST.
12 Would they have been required to write paper, the required removal
13 paper, to open and closed that door? Would that have been in
14 CMES?

15 MS. LUND: Yes.

16 MR. GERLACH: That's the only question I have for you. Thank
17 you very much.

18 CHAIR HOMENDY: IAM.

19 MR. HOLDEN: Again, on the process to determine whether
20 removal was necessary, it was elevated -- was it elevated from
21 tier one to tier two to tier three to make that decision? Is that
22 what the elevation within the SAT system was referring to on who
23 was going to make the decision for a removal?

24 MS. LUND: My reading of the elevation of the SAT system was
25 to get the work done. It was the people saying we need this rivet

1 rework done. The conversation came as the people were talking
2 back and forth about, okay, what is it, which model is it, do we
3 need a removal. It wasn't the elevation to get the decision. It
4 was the elevation to get the work completed as it continued to
5 proceed down the factory floor.

6 MR. HOLDEN: Thank you.

7 CHAIR HOMENDY: No more questions for IAM. Spirit.

8 MS. MEYER: No questions, Chair.

9 CHAIR HOMENDY: ALPA.

10 MR. JENGELIS: Thank you, Madam Chair.

11 This this question is for Mr. Riney. Your comments earlier,
12 you noted that your contract employees are changed with the
13 fluctuating demand. Given that, how do you keep track of who's
14 been trained on what tasks like door removal and installation?

15 MR. RINEY: So again, none of the Spirit contractors would do
16 any door removals. The tasks that they would be assigned would be
17 more rework related, whether it's, again, some examples, missing,
18 mislocated brackets, open holes, tool marks, that type of thing.

19 That type of skill is -- or that that type of -- the initial
20 training or their onboarding would determine that from their
21 resume and the assessment that's performed. Now there's an
22 assessment performed in Wichita and then an additional assessment
23 performed in Renton by Boeing.

24 MR. JENGELIS: Earlier you stated that you only require sheet
25 metal experience when you hire an inspector. Does an inspector

1 have more specialized experience applicable to what they're
2 inspecting?

3 MR. RINEY: So for the hiring of the inspectors, it would be
4 their inspection history or what work they performed as an
5 inspector. Of course, due to the type of work that we're
6 performing, it would lend itself to be those types of MRO or
7 previous Boeing work history, that type of thing. Not necessarily
8 a specific inspection job that they may have had.

9 MR. JENGELIS: So to confirm it's not just sheet metal
10 experience you're looking for in your inspectors.

11 MR. RINEY: Correct.

12 CAPT JANGELIS: Thank you. No further questions.

13 CHAIR HOMENDY: Alaska.

14 MR. TIDWELL: No questions at this time. Thank you.

15 CHAIR HOMENDY: AFA.

16 MR. HEIPLE: No further questions.

17 CHAIR HOMENDY: All right. FAA.

18 MR. GERLACH: Yeah, two quick questions.

19 You mentioned the pre rig that's done by Spirit, is that
20 correct, Mr. Riney?

21 MR. RINEY: Correct.

22 MR. GERLACH: And then there is the final rig on the door
23 plug and that is done by Boeing.

24 MS. LUND: Boeing.

1 MR. GERLACH: And who does that final rig, and it's a Boeing
2 employee, but what part of the team?

3 MS. LUND: A door employee.

4 MR. GERLACH: So the door team does the final rig. Okay.
5 Thank you. Those are all my questions. Thank you, Chair.

6 CHAIR HOMENDY: Thank you. IAM.

7 MR. HOLDEN: No further questions.

8 CHAIR HOMENDY: Spirit.

9 MS. MEYER: No further questions, Chair.

10 CHAIR HOMENDY: ALPA.

11 MR. JENGELIS: No further questions.

12 CHAIR HOMENDY: Anyone else have questions? All right.

13 Moving to the Board of Inquiry.

14 Can you pull up Exhibit 11D? While she pulls that up, I do
15 have a couple of questions, just to clarify. We do not know
16 specifically when or who this -- when this door plug was opened.
17 And we do not know by whom.

18 MS. LUND: Correct.

19 CHAIR HOMENDY: Same with closure.

20 MS. LUND: Correct.

21 CHAIR HOMENDY: Okay, great. What I want to know is what
22 happened to the hardware? So typically when hardware comes out,
23 you open a door and hardware comes out, where does it go?

24 MS. LUND: It goes on our work in process rack.

1 CHAIR HOMENDY: And did -- I heard you say you had a policy
2 to use new hardware. So hardware that would be removed, would
3 that be discarded, or I may have misunderstood that?

4 MS. LUND: That is what we have done on this plug when we are
5 doing our MOM, now that we, post accident, when we are
6 fundamentally taking it out every time, double checking it,
7 putting it back together, that's when we are always using the new
8 hardware. When I inquired, does it -- would it have had to have
9 been in the past. That was the answer that was given. If the
10 hardware is in perfect condition, fully conforming, it could have
11 been used again.

12 CHAIR HOMENDY: So it could have been used again on this, on
13 this plug.

14 MS. LUND: Had it been in perfect condition. Correct.

15 CHAIR HOMENDY: And in this case, if that -- was that clear
16 with all employees that you would reuse that hardware, or some
17 employees might discard the hardware and get new hardware.

18 MS. LUND: It could happen either way.

19 CHAIR HOMENDY: Okay

20 MS. LUND: Our general approach is when you take something
21 off an airplane, you check to make sure that it's still fully
22 conforming. That's a check that an employee does. If it has a
23 nonconformance on it, it gets processed differently. It has a tag
24 that goes with it. It gets put in a different process in either
25 reworked or scrapped, discarded. If it's in perfect condition, it

1 goes on the work in process rack and can be reused and
2 reinstalled.

3 CHAIR HOMENDY: We do not have hardware for this door plug.

4 MS. LUND: That is correct.

5 CHAIR HOMENDY: Okay, great. On the Shippside Action Tracker,
6 which I know is very redacted here, but I'm going to ask some
7 questions and just going back to some previous responses. I just
8 want to clarify. The actions here started on September 1st. I
9 just had them -- Leoni move up to the 12th because I have some
10 questions.

11 Around the 12th is when access started to be discussed. I
12 know earlier you said there was some discussion of whether it was
13 a door plug or a door. I don't see that in the unredacted
14 version. So I see there's a lot of references to access. Access
15 is needed, or no access is provided. Then I see a lot of
16 references to door. But it seems to be unclear whether it's a
17 door or a plug. Would you agree with that? But you've seen the
18 other --

19 MS. LUND: I have. I have.

20 CHAIR HOMENDY: The unredacted version. Is that clear?

21 MS. LUND: That was absolutely a dialogue up front. Is it a
22 door or a plug. I'm sorry, maybe not in the SAT. The access that
23 was needed. I apologize for that. In the SAT's, as I think about
24 the SAT, it was we need help. We need access to the door, we need
25 a stand.

1 CHAIR HOMENDY: I see. So where did that discussion occur,
2 whether it was a door or a plug? Not in the -- I don't see it in
3 the SAT.

4 MS. LUND: I want to be really respectful. In the, in the
5 factual report on the public record, it was referenced that we had
6 the SAT, but we also had looked at some texts between mechanics or
7 other things.

8 CHAIR HOMENDY: So texts.

9 MS. LUND: And that's where I had seen that.

10 CHAIR HOMENDY: Understood. Okay, great. I have a question,
11 I have a question about the tier change, and I know there have
12 been lots of questions and so, Leoni, if the tier change we go
13 from one to two on September 14th. If you can show that. Scroll
14 up a little. Okay. It may not be here, but on the unredacted
15 version, it's in bold tier change, one to two, with dollar signs
16 on both sides.

17 And then on the 17th it goes from two to three. Again, bold
18 tier change, two to three, meaning it's elevated. There's
19 urgency. We need this addressed. Again, dollar signs. 18th it
20 goes back to three to two, dollar signs. There are other
21 automatic notes in here without dollar signs. Why the dollar
22 signs? What does the dollar sign mean?

23 MS. LUND: The dollar sign is what the system uses when it
24 gets elevated in a tier level. So when it gets elevated to a tier

1 level, the dollar sign references the elevation process of the
2 tier process.

3 CHAIR HOMENDY: It has no reference to -- I just want to make
4 sure I'm clear. It has no reference to, hey, this has been going
5 on quite a long time. This is costing us money. We need
6 assistance.

7 MS. LUND: I have, I have no idea why the dollar sign is the
8 sign that is used when you elevate it, but it is. It is the sign
9 that it has been elevated in a tier level.

10 CHAIR HOMENDY: Okay.

11 MS. LUND: That change was set up in the tool long before I
12 got here.

13 CHAIR HOMENDY: Thank you. No, I just wanted to clarify.

14 MS. LUND: Thank you.

15 CHAIR HOMENDY: Member Graham.

16 MEMBER GRAHAM: Thank you, Chair.

17 Ms. Lund, I want to thank you for taking us through the flow
18 of the unit number in question. I do have some clarifying
19 questions on that. You did state on flow day nine, that there is
20 a fit and fair check. Is that correct?

21 MS. LUND: Yes.

22 MEMBER GRAHAM: And it's external only?

23 MS. LUND: Yes.

1 MEMBER GRAHAM: Okay. Now the door work and the door being
2 removed happen on flow day ten, and I think there was about three
3 days in there. Would that have triggered this to be done again?

4 MS. LUND: To be checked again.

5 MEMBER GRAHAM: In a in a perfect world.

6 MS. LUND: In a perfect world, as a part of reinstalling that
7 plug, we would recheck the fit and fair.

8 MEMBER GRAHAM: Okay. Did that happen in this case?

9 MS. LUND: There is no documentation that I've seen that that
10 happened in this case.

11 MEMBER GRAHAM: Okay. For removing the door plug, is it only
12 a door crew member that can remove and reinstall the door plug?
13 Is that, is that fair to say or can somebody else?

14 MS. LUND: Well, I would say we just had that conversation.
15 I believe it is a door crew responsibility, but I was reminded and
16 accurately so that people like AOG or other highly trained
17 employees that are multiskilled can also do it.

18 MEMBER GRAHAM: Okay. So I talked earlier in panel one about
19 the process that when the nonconformity on the rivets was
20 identified and basically a NCO was written, that would not
21 necessarily trigger a removal to be written yet. Is that correct?

22 MS. LUND: That's correct.

23 MEMBER GRAHAM: Who would trigger a removal to be written?
24 Would it be Spirit going, hey, I need the door open so I can do
25 the rivets.

1 MS. LUND: Ideally, yes. And then the employee who realizes
2 they need to open the plug, and we talk about this all the time,
3 so I'll just respectfully --

4 MEMBER GRAHAM: Yeah.

5 MS. LUND: -- say plug not door because the door is a
6 different circumstance, but with the plug, when an employee says I
7 need to open the plug, that employee needs to say before I open
8 this previously installed assembly or action, I need to go get a
9 removal.

10 And so it's that employee's responsibility to, in September,
11 write the removal or ask for help from someone to write a removal
12 before it -- parts to remove from the airplane.

13 MEMBER GRAHAM: Okay. So since a Spirit employee or
14 contractor cannot do that, then it has to be a Boeing employee
15 that helps them.

16 MS. LUND: It does.

17 MEMBER GRAHAM: Okay.

18 Does -- let me ask Spirit. Do your people that work, that
19 worked on the rivets and inspect the rivet work, do they see the
20 NCO?

21 MR. RINEY: Yes, they have access to CMES.

22 MEMBER GRAHAM: Okay.

23 MR. RINEY: And they have the ability to stamp within CMES.

24 MEMBER GRAHAM: And they have the ability to stamp it.

25 MR. RINEY: Correct.

1 MEMBER GRAHAM: Do they see the paperwork for a door removal?

2 MR. RINEY: I don't believe that they saw that information.

3 MEMBER GRAHAM: Okay.

4 Did Ms. Lund, do they have access to see that paperwork?

5 MS. LUND: They didn't. They, my understanding and Mike
6 knows better than me, have access to see really the part of the
7 paperwork that applies to their work statement only.

8 MEMBER GRAHAM: Okay. Now, when I asked you earlier about
9 the process, when they finished their work, there is a stamp on
10 the NCO by the mechanic that did the rivet work. There's a buy
11 off by Spirit's QA inspector. And then you said that Boeing would
12 buy it off, but after the door plug is installed.

13 MS. LUND: No.

14 MEMBER GRAHAM: Okay.

15 MS. LUND: For the NCO --

16 MEMBER GRAHAM: Okay.

17 MS. LUND: -- for the rivets in and of themselves, they would
18 stamp it after the Spirit quality inspector for that NCO, that NCO
19 just says fix these five rivets.

20 MEMBER GRAHAM: Yeah, okay.

21 MS. LUND: So they'll stamp that.

22 MEMBER GRAHAM: So the, so the Boeing's going to come in and
23 inspect the work and buy it off.

24 MS. LUND: Yes.

1 MEMBER GRAHAM: And I think if I'm correct, I saw that on the
2 NCO on 9/19 at 1811 that a Boeing quality inspector bought off and
3 stamped that. If I remember on the NCO correctly. At that point,
4 the door, I believe, would still be open, the door plug.

5 MS. LUND: I believe that is true.

6 MEMBER GRAHAM: What should that have triggered next? Should
7 the inspector have called for a reinstall, or what?

8 MS. LUND: Yes. So the next step would be likely the manager
9 in the area to say the next job that we need to go complete is the
10 reinstallation of this plug.

11 MEMBER GRAHAM: Okay. The manager --

12 MS. LUND: Or the team lead.

13 MEMBER GRAHAM: -- but not the --

14 MS. LUND: Manager or team lead.

15 MEMBER GRAHAM: -- quality inspector.

16 MS. LUND: Not the quality inspector.

17 MEMBER GRAHAM: Okay. So there was an opportunity missed
18 there to see that there was -- the removal paperwork was not
19 there.

20 MS. LUND: Correct. Because that inspector came --

21 MEMBER GRAHAM: And then --

22 MS. LUND: -- to buy off their NCO.

23 MEMBER GRAHAM: We don't see anything from a manager stating
24 anything like that --

25 MS. LUND: Correct.

1 MEMBER GRAHAM: -- in the documents.

2 MS. LUND: Correct.

3 MEMBER GRAHAM: So we have a gap. Thank you, Chair.

4 CHAIR HOMENDY: Member Chapman.

5 MEMBER CHAPMAN: Thank you, Chair.

6 This is a question for both of you, if you could just kind of
7 follow me through here. According to the manufacturing records
8 and human performance factual report, the four bolts that prevent
9 upward movement of the door plug were installed by Spirit on July
10 28th, 2023.

11 The factual report indicates further that that was done
12 during the completion of a specified production order. Those
13 details all appear, just FYI, on page 12 of the factual report.
14 Do either of you dispute this narrative that the four bolts were
15 installed by Spirit on July 28th?

16 MS. LUND: I do not.

17 MR. RINEY: I do not.

18 MEMBER CHAPMAN: And is there any evidence that you know of?
19 I do not. Is there any evidence that you know of that the door
20 plug was reopened between the date the four bolts were installed,
21 which again is July 28th, and the date the fuselage was delivered
22 to Boeing, which I believe was August 31st, 2023.

23 MS. LUND: There is no evidence that I know of.

24 MR. RINEY: I do not know of any other.

25 MEMBER CHAPMAN: So is there agreement between Boeing and

1 Spirit that the four bolts were properly installed and in place at
2 the time the fuselage was delivered to Boeing?

3 MS. LUND: I believe they were.

4 MEMBER CHAPMAN: Thank you. This next question, I'm not
5 suggesting there's anything untoward about this at all. I just
6 want to factually clarify. I think it's exhibit 11A, no need to
7 pull that up, but exhibit 11A shows a photograph of labeling on
8 the door plug. And that labeling indicates that it was intended
9 for line unit 8799.

10 The fuselage on which it was installed was actually 8789. So
11 those two numbers don't match up. Is there anything particularly
12 unusual or problematic about that?

13 MR. RINEY: No. Within Spirit's production system, the use
14 of reallocations is available for us when there could be part
15 availability or concerns with the original installation. There
16 could be another installation that's used in its place.

17 MEMBER CHAPMAN: Okay. Thank you. Similar sort of question,
18 not suggesting there's any issue at all, Ms. Lund. This just for
19 clarification. It's my understanding that there's a security
20 video system in the factory, and that video is retained at least
21 for some period of time. There is no video footage of 8789 during
22 production. Could you just explain why that's the case?

23 MS. LUND: I believe, I understand that that security footage
24 writes over itself every 30 days. And because the airplane was
25 built in the September timeframe, the accident occurred in

1 January, at which point we went to go look at the footage. It had
2 been rewritten over itself because it's a 30 day timeframe that
3 it's kept for.

4 MEMBER CHAPMAN: So this is frankly not unlike the cockpit
5 voice recorder issue. It's been overwritten and it's no longer
6 available.

7 MS. LUND: That is correct.

8 MEMBER CHAPMAN: Just for -- actually, Chair, I'm going to
9 save my questions for the next round. Thank you.

10 CHAIR HOMENDY: Thank you very much. We'll do Member Brown's
11 questions later in the interest of time. So Member Inman.

12 MEMBER INMAN: Thank you.

13 So Mr. Riney, let me just go back. You originally at the
14 very start, I know that was seemed like hours ago, and it may have
15 been a couple hours ago, you said there were no significant issues
16 in the manufacturing the door plug that were found. Is that
17 correct?

18 MR. RINEY: Correct.

19 MEMBER INMAN: What rises to significant?

20 MR. RINEY: In my mind, it would be replacement of a
21 structure that was original to the door.

22 MEMBER INMAN: The reason, the reason I bring that up, in the
23 manufacturing records and human performance factual it mentions
24 that there were discrepancies that were found during the
25 manufacturer, specifically for the mechanics not reporting the

1 torque wrench and serial numbers in the production order, and for
2 not providing the sealant/paint information in the production
3 order.

4 I did see they were later corrected in the system, but they
5 were initially found as an issue. Do you see that as a recurring
6 issue?

7 MR. RINEY: No. There's processes in place to have those
8 addressed by engineering when they are identified.

9 MEMBER INMAN: There's also a process in place to close the
10 door whenever it's taken out.

11 MR. RINEY: Agree.

12 MEMBER INMAN: Okay. Can we -- I also want to just go back,
13 and we were talking about the timelines, especially I was
14 interested about the question on the blankets. Did we actually
15 identify that the blankets were installed? I know that it was
16 okay to install on September 20th. Were they installed on that
17 date, or do you know Ms. Lund?

18 MS. LUND: The blankets were mostly installed. I believe the
19 picture that was shown earlier in the presentation showed a
20 blanket sign pulled back out of the way, so we were -- that shows
21 they weren't fully installed at that point. Then the okay to
22 install was given. I believe it was on the 20th, and at that
23 point it did proceed. The blanket was dropped back down, and the
24 rest of the build proceeded.

25 MEMBER INMAN: Okay. Can we pull back up the Boeing

1 manufacturing timeline that she referenced earlier? I'm just
2 going back to this just to try to understand something on here.
3 It was on 9/15, and again, it was flow day ten, where we talk
4 about the tier two. On the 16th and 17th, those were weekend
5 days. Right?

6 MS. LUND: Correct.

7 MEMBER INMAN: But it appears that this got elevated to a
8 tier in the SAT tracker, and I'm going to go to the SAT tracker in
9 a moment. And then it was also the door crew manager made notes,
10 or other managers did. Was that a Sunday production time?

11 MS. LUND: That would imply to me that people were working on
12 Sunday.

13 MEMBER INMAN: But would that have also been another flow day
14 ten?

15 MS. LUND: It was sitting in flow day ten. The difference in
16 a M day or a business day and a weekend is we don't load new jobs.
17 It's not a day we typically move the airplanes. It's a day when
18 we would complete incomplete work, if we have a team working or
19 catch up on something.

20 MEMBER INMAN: Would that be Boeing personnel or contractors?

21 MS. LUND: Boeing doesn't have manufacturing contractors.
22 All of our employees are fundamentally IAM employees. They're
23 full employees.

24 MEMBER INMAN: All right.

25 MS. LUND: And so it's Boeing personnel. And if Spirit were

1 to work on that day, it would be their contractors, as we have
2 heard.

3 MEMBER INMAN: Okay.

4 So can we pull up then just to go ahead and get to that then?
5 Page 26 of the manufacturing records, human performance. So this
6 is actually kind of a chronology. I know earlier the Chair was
7 looking at -- showing a lot of different things in here. And I'm
8 going to actually ask Mr. Riney again. Earlier, you also said
9 that you don't have access to the SAT. Is that correct?

10 MR. RINEY: Correct.

11 MEMBER INMAN: There's a lot of references in here, in this
12 group factual report. And I'll specifically, if we can drop down
13 just a little bit. Okay, we can stop. So I'm going to go back to
14 say the per Spirit management on September 15th, access and
15 removal are needed. That is a Boeing employee putting that in
16 there.

17 MR. RINEY: Correct.

18 MEMBER INMAN: So even on September 18th, doors being opened
19 by a mechanic at 11:00 a.m. per Spirit manager, access is now
20 available.

21 MR. RINEY: That would also be Boeing employee inputting
22 those comments.

23 MEMBER INMAN: And so they're entering comments on your
24 behalf.

25 MR. RINEY: Correct.

1 MEMBER INMAN: Okay. And this is happening again on, I
2 believe the 18th was the Sunday. Sorry, 17th, we'll go back.

3 MS. LUND: The 18th is a Monday.

4 MEMBER INMAN: Yeah. Yeah. On the 17th, no access. And it
5 was elevated at that point on this Sunday at 3:54 from a tier two
6 to tier three, which obviously as you said, gets a lot more notice
7 throughout the plant. On a Sunday, it's elevated. LSCC and who
8 is LSCC?

9 MS. LUND: Line Side Control Center, the group of employees
10 who are next to the airplane that help.

11 MEMBER INMAN: Okay. They're going to coordinate with the
12 first shift to gain the access, which includes, which includes
13 opening and removing. And then at 6:15, the senior manager worked
14 with the door crew manager to determine if the door can just be
15 opened or if it needs removal. That gives me the appearance that
16 Spirit and Boeing were all trying to get this plane done on
17 Sunday. Is that correct?

18 MS. LUND: Yes.

19 MEMBER INMAN: And then at 7:00 a.m., whenever the first crew
20 comes on, it was downgraded right then from tier three to tier
21 two. Got it out of the management's review.

22 MS. LUND: At least a level down, yes.

23 MEMBER INMAN: Saying that it was -- door is being opened by
24 the mechanic. And I guess the question is, if Boeing, if the door
25 crew manager was knowing at that point, was it the manager who

1 would have anticipated writing the order for removal or would the
2 mechanic who was getting the instruction.

3 MS. LUND: The mechanic typically writes the removal.

4 MEMBER INMAN: And so it's a mechanic --

5 MS. LUND: At that time.

6 MEMBER INMAN: At that time.

7 MS. LUND: Now it's the -- yes.

8 MEMBER INMAN: So at some point between 7:00 a.m. and 11:00
9 a.m. on September 18th, that door was opened.

10 MS. LUND: Yes.

11 MEMBER INMAN: Okay. I'm sorry. I'm over my time. I'll
12 wait for her to --

13 CHAIR HOMENDY: No, your fine.

14 MEMBER INMAN: No, I'm fine. Thank you.

15 CHAIR HOMENDY: No, you're fine.

16 Mr. Riney, question. Per contract for your contractors, what
17 are the hours and days that they work?

18 MR. RINEY: When requesting contractors, we state that they
19 need to be available either first shift or second shift. And it's
20 typically a Monday through Friday work week, but there is overtime
21 available.

22 CHAIR HOMENDY: There is overtime. You mentioned earlier
23 Monday through Friday typically, unless the weekend's required
24 from about, I thought you said 6:30 to 2:30 or 6:00 to 2:30.

25 MR. RINEY: 6:00 to 2:30 is --

1 CHAIR HOMENDY: 6:00 to 2:30.

2 MR. RINEY: -- the normal first shift hours.

3 CHAIR HOMENDY: Does it -- we interviewed mechanics who
4 reported working six to seven days a week pretty regularly and
5 normally working anywhere between ten to 12 hours a day. One said
6 that's just our typical schedule, looks like. But in an eight
7 hour shift contract, so on paper it seems to be weekdays from, you
8 know, 6:00 to 2:30, there was a reference to 8:00 to 4:00.

9 But in reality, these individuals said they pretty regularly
10 work ten to 12 hour days, six to seven days a week. Does that
11 surprise you?

12 MR. RINEY: Not normally. They do work extended hours or
13 multiple days and that's normally by choice, if we have the work
14 available. It's a voluntary basis.

15 CHAIR HOMENDY: A Boeing employee said there is pressure to
16 get things done on the floor. One said yes, it's always go, go,
17 go. Another said, their priorities are figure out why jobs are
18 behind schedule. Job behind schedule or JBS seems to be a common
19 acronym and then they go on, that seems to be the big push. It
20 seems to be more important than knowing your own employees, making
21 sure we're on schedule.

22 The contractor in response to us asking about whether that
23 person feels pressured to complete work, or they're looking to do
24 overtime, they had made very clear both -- many contractors had
25 made clear, it's not for overtime, but that there's pressure to do

1 work. When asked who applies the pressure, the response is
2 Boeing. Boeing because basically it seemed like a block for them
3 to install their lavs. A block for them to install the
4 floorboards.

5 Because they're trying to meet demand, it's pressure there,
6 like it needs to get done today. And the power is off on this
7 plane, but we have to have it back tomorrow, and it's in this flow
8 day or that flow day, and they have to get done. Another one said
9 when we're very overwhelmed with the work, it is pressing because
10 everything we've cut down on some personnel. So now it's like to
11 order for me -- in order for me to not have to deal with the worst
12 situation tomorrow, I'd rather work 12 to 13 hour shift today, to
13 get it done because the pressure is very heavy, it does get heavy.

14 I feel like -- does that concern you that there is pressure
15 for your contractors, or that they feel pressured?

16 MR. RINEY: I think the very nature of why we're there, our
17 entire job is to get out of Boeing's way. We understand that we
18 are inhibiting them from their follow on activities for their
19 build. I don't see it as us standing over them, telling them that
20 they have to get it done in an unsafe or a manner that would
21 inhibit quality of the product.

22 CHAIR HOMENDY: But --

23 MR. RINEY: Their role is to perform the rework and allow
24 Boeing to continue with their build.

25 CHAIR HOMENDY: Would you agree that a -- these contractors

1 and others who feel that there is pressure to work, that fatigue
2 and that pressure can have an impact?

3 MR. RINEY: Yes. And that's why we offer the overtime as a
4 voluntary basis. It's not a requirement.

5 CHAIR HOMENDY: Are you tracking how much overtime is being
6 worked?

7 MR. RINEY: I view the time cards of the individuals.

8 CHAIR HOMENDY: From a safety perspective.

9 MR. RINEY: The mechanics that I talked to, they understand
10 their role as the work that they're performing, and I believe that
11 they are there to perform that role. And they have not elevated
12 those types of issues, the fatigue or unwillingness to come in on
13 a weekend or that type of thing.

14 CHAIR HOMENDY: Well, they certainly made very clear to our
15 investigators that this is an issue.

16 MR. RINEY: I --

17 CHAIR HOMENDY: So if they haven't raised it, perhaps that's
18 something you should be looking at --

19 MR. RINEY: I will definitely follow up.

20 CHAIR HOMENDY: -- from a safety perspective.

21 MR. RINEY: I will definitely follow up with them.

22 CHAIR HOMENDY: Okay, thank you. I know I'm at time or over
23 time. So Member, well not Chapman. Graham, it's a long day.

24 MEMBER GRAHAM: Hey you works too.

25 Just a couple of questions, couple more. Whether the door

1 plug is just open where it goes out, what 15 degrees on the
2 lanyard, or if it's laid all the way out and removed, is a removal
3 required?

4 MS. LUND: Yes.

5 MEMBER GRAHAM: And why is that?

6 MS. LUND: Because even to open it a little bit, bolts must
7 be removed from the plug.

8 MEMBER GRAHAM: All four. Correct?

9 MS. LUND: I believe so.

10 MEMBER GRAHAM: Yes. I double checked yesterday.

11 MS. LUND: Yes, yes.

12 MEMBER GRAHAM: Okay.

13 MS. LUND: Yes.

14 MEMBER GRAHAM: So I think some people were a little
15 confused. If you just open it a little bit, now you got to take
16 them all four out. That's a big deal. Where else would somebody
17 on the line see the removal paperwork? Is it -- It's in CMES.

18 MS. LUND: Yes.

19 MEMBER GRAHAM: Okay. Would there be any mention of it at
20 the Shippside Action Tracker?

21 MS. LUND: There could be. As has been referenced here.

22 MEMBER GRAHAM: And that's just the communication, like, hey,
23 I need a removal.

24 MS. LUND: Yep.

25 MEMBER GRAHAM: Or hey, I need to reinstall. Hopefully that

1 would trigger somebody to be looking for that removal paperwork.

2 MS. LUND: Right.

3 MEMBER GRAHAM: Okay. I want to thank both the witnesses.

4 That's all the questions I have here. Thank you.

5 CHAIR HOMENDY: Thank you. Member Chapman.

6 MEMBER CHAPMAN: Thank you, Chair.

7 Just to put it out there, Boeing's initial review and reviews
8 since have determined -- you've not found any paperwork indicating
9 that this door was authorized to be opened and then authorized to
10 be closed. Is that correct?

11 MS. LUND: We've not found any paperwork. That is correct.

12 MEMBER CHAPMAN: Member Inman went through the details of
13 what's in the SAT record, which indicates that the door would have
14 been opened, the door plug would have been opened on the morning
15 of September 18th, 7:00 there's an entry. The door is being
16 opened by a mechanic. 7:17 another entry, the door is being
17 opened per the door crew manager.

18 At 10:05, there's an entry indicating that a Spirit manager
19 confirmed that access was available. I assume what that means is
20 that access was available to do the repair work on the rivets.

21 MS. LUND: That is the way I read it too.

22 MEMBER CHAPMAN: Okay. At what point during this apparent
23 timeline should there have been a trigger for a requirement for
24 the paperwork.

25 MS. LUND: The paperwork should be filled out and completed

1 before the act of removing the part from the airplane or opening
2 the plug. So when the employee who is ready to open the plug,
3 before they open the plug, they need to fill out the removal
4 paperwork, and then proceed with the removal. That's where it
5 should have occurred.

6 MEMBER CHAPMAN: So we have entries in the morning of the
7 18th. And these are basically for communications purposes.

8 MS. LUND: Correct.

9 MEMBER CHAPMAN: Indicating that the decision basically has
10 been made to open the door. We don't -- we never see the actual
11 paperwork. We just know that the door got opened, so it was
12 somewhere in that window that the discrepancy from what should
13 have been the procedure occurred.

14 MS. LUND: Correct.

15 MEMBER CHAPMAN: Should the lack -- I mean ideally, should
16 the lack of documentation have prohibited continuation of the
17 work?

18 MS. LUND: Yes.

19 MEMBER CHAPMAN: And similarly, should the lack of
20 appropriate documentation have prohibited the final acceptance to
21 close the nonconformance order?

22 MS. LUND: The nonconformance order that was bought off and
23 closed really was for five rivets.

24 MEMBER CHAPMAN: Okay.

25 MS. LUND: And it was that -- Spirit's job, and the Boeing

1 inspector's job to -- what they were confirming is what was on
2 that NCO, and that NCO only said these five rivets need to be
3 removed and replaced. They looked at it, they looked for the
4 drawing, said yes, it's good.

5 The inspector doing that would not have necessarily known now
6 I need to go look for the removal. The removal is a different
7 piece of paper.

8 MEMBER CHAPMAN: Okay.

9 MS. LUND: It has a quality stamp. It would have had, it
10 would have had the person come and stamp it when we reinstalled
11 from the removal. That's where that quality stamp would have
12 happened. In terms of removing the removals, I don't think that
13 quality inspector -- they were there to buy off that piece of
14 paper --

15 MEMBER CHAPMAN: Okay.

16 MS. LUND: -- which was about the rivets.

17 MEMBER CHAPMAN: So help me with this. Tell me if I've got
18 this right. What should have happened once the decision was made
19 to open the plug, somewhere soon after that, there should have
20 been essentially a trigger requiring paperwork. The work should
21 not have progressed, ideally, without that paperwork.

22 And then once the work was completed, the removal
23 documentation, that should have then triggered the closing and the
24 signing off of the fact that the plug was closed and secured.
25 Right?

1 MS. LUND: That is how it should happen. Correct.

2 MEMBER CHAPMAN: Okay. Thank you very much. Chair, that's
3 my last question.

4 CHAIR HOMENDY: Thank you. Member Inman.

5 MEMBER INMAN: Thank you.

6 I'm going to -- and I hope I don't drive you crazy, but can
7 you bring up 11L, please? And actually on the bottom of page 41
8 of the actual document, 41. Yep. The bottom of that page.

9 So we're looking at, and this is one of the basically a
10 Spirit contractor who had been working at Boeing, I think through
11 a couple of different subcontractors for about five years. And
12 the question at line 20 is you said you're working six to seven
13 days a week. Yeah. Do you guys experience a bit of fatigue, yes.
14 Because it's so demanding to try and keep up with all the work.
15 Sometimes our jobs take really long hours.

16 Scroll down a little bit. Onto the next page. Sorry. Do
17 you feel pressure to complete the work sometimes, yes. Who is
18 that pressure from, Boeing? Basically seems like a block of time
19 to install their lavs. Ms. Lund, what do you think about that?

20 MS. LUND: I feel like there is some inherent pressure to get
21 the job done. I can understand why they feel that. What they're
22 saying is when you look at the bar chart that was referenced
23 earlier, the next block is somebody else needs this job done so
24 they can complete their job.

25 One of the things we talk a lot about is in aerospace, there

1 sometimes is operational pressure. There's operational pressure
2 to release your airplane on time. There's operational pressure
3 for us to build and deliver an airplane. What can never happen is
4 to sacrifice quality or safety for operational pressure.

5 MEMBER INMAN: Okay. Can we go back to that exact same
6 document except go to page 54. And this was a little disturbing.
7 And I know, Mr. Riney, you weren't part of this statement. But it
8 kind of called out a little bit of what may be a bigger issue.
9 Then at the very bottom, line 23 -- or 21.

10 How do you feel the interaction is between Spirit and Spirit
11 contractors and the Boeing mechanics? Well, basically, we're the
12 cockroaches of the factory. So respectfully. I don't know what
13 was respectful about it, but it was a little bit concerning to see
14 that. I guess, Mr. Riney, what do you have to say to it?

15 MR. RINEY: We're outsiders. We're in, as part of our teams
16 presence in the factory, we're in the way. We're doing our best
17 to get out of the way, as I stated earlier. These individuals,
18 they're not Boeing employees, but they are there to perform a job.

19 I have not heard specific instances that Boeing teammates are
20 treating them disrespectfully. I think they just understand that
21 their role is consistently between them and Boeing completing
22 their work and they are doing their best to remove themselves out
23 of the, out of the Boeing teams way.

24 But again, I have not heard specific instances where they've
25 been treated negatively. If I would have, I would have raised

1 those to the Boeing team, and I have no worry that that would have
2 been addressed.

3 MEMBER INMAN: And I realize, it's one employee, it's an
4 independent contractor. It may not be the views of everyone, so
5 I'll just handle that one for you. And I would note in several of
6 the transcripts, a few of them subcontractor said they would
7 suggest to their friends that they should go to work for Boeing
8 first in different ways because everyone has a different reason,
9 flexibility, training, things of that sort.

10 So I don't want to leave that just totally hanging, but it's
11 a very descriptive sentence and a very important issue. And we'll
12 -- well, I have a few more seconds. Can we also go -- jump to
13 page 61?

14 And I guess for the people that are watching, Mr. Riney,
15 Ms. Lund, you all have seen all of this before, even before today
16 opened up. Right?

17 MR. RINEY: Yes.

18 MS. LUND: Yes.

19 MEMBER INMAN: Go down to the bottom on -- the questioning is
20 basically starting with what safety management systems means.
21 Just something for me, looks more like a system for safety is in
22 the airplane. I don't know. I actually don't even know that
23 word.

24 Drop down to the next page please. Safety culture makes more
25 sense. And if you go down into basically line 12. I don't really

1 think, I think it's just that they have on the walls and that
2 they're talking about it like the five S's. And FOD is really,
3 really a big thing. But other than that they have posters on the
4 wall. I don't really like, have like a concept. Is that a little
5 concerning?

6 MS. LUND: It is concerning. There is no doubt about it.
7 We, as we mentioned earlier, started implementing this safety
8 management system. And I think part of it is that term, you'll
9 notice through here that the employees can talk some of the
10 specifics. They could talk the importance of tool control or
11 compliance.

12 But as we were rolling this out, we did not have it fully to
13 the factory floor when either the ACSAA-103 panel, or at the time
14 of the accident, had fully deployed to the floor. This is a big
15 priority of us right now, taking it to the factory floor, helping
16 them understand what the safety management system. Helping them
17 understand what their role is in the safety management system.

18 And we had not fully educated the people on the floor, hardly
19 at all. Such that they knew what safety management system really
20 meant for them, and that's a that's a deployment of the safety
21 management system that we're working on hard right now.

22 MEMBER INMAN: Chair, if I can have a couple extra seconds.
23 Mr. Riney, this is not a name that's redacted. The person who
24 gave this information to us. And as the Chair said earlier, the
25 party system is very important. I hope by me calling out this

1 person in their statements, we won't be looking at a situation
2 where they might face adverse action for telling us the truth
3 during their statement. Does that makes sense.

4 MR. RINEY: Could you state the question again?

5 MEMBER INMAN: Chair, would you like to speak for me? I'm
6 done.

7 CHAIR HOMENDY: He wants to make sure that by raising these
8 concerns that these contractors will not be retaliated against by
9 Spirit or Boeing.

10 MR. RINEY: No.

11 CHAIR HOMENDY: Okay. So then that -- I'm going to actually,
12 Ms. Lund, go ahead.

13 MS. LUND: I was just going to concur with Mr. Riney that
14 they will not be retaliated by Boeing for that portion of the
15 question.

16 CHAIR HOMENDY: Thank you, and excellent line of questioning.
17 I'll have some questioning along safety culture and SMS tomorrow.
18 But I do, I want to continue on with that line of questioning. I
19 did feel like the comment, this is a very experienced person,
20 somebody who's been on scene for -- or in the factory for quite a
21 long time, not somebody who's new. Seems to do excellent work.

22 So the term cockroach, which this individual felt, and I'll
23 just give the entire context. The contractor said when asked the
24 question about -- it was about the relationship between Spirit
25 contractors and Boeing personnel in the factory. And the response

1 was well, basically we're the cockroaches at the factory. There's
2 defects and they hold up your job. We're looked at as it's your
3 fault because you, how do you do the rework. We do get dogged a
4 lot.

5 And so this seemed to be not a surprise in the interview with
6 Ms. Lund, who said, I do think, which we're working hard to fix,
7 there's a little bit of an us versus them feeling at the front
8 level within Boeing versus Spirit on the front line. I don't
9 think the front line loves supplier assist. I think their
10 fundamental position that I hear from them on a regular basis is
11 we shouldn't need supplier assist, because they should send us
12 these perfect fuselages regardless, and you can't argue with that.

13 The -- it is, it is August 6. This interview was done in
14 March. What has Spirit done to get information from its workforce
15 on possible pressure on feeling like they are constantly reworking
16 things in Renton and feeling pressure as this moves through flow
17 -- I mean, this was a nine, ten day flow day which ended up to be
18 18 days to get this fix done, which can't be good for anyone.

19 And yet, you have personnel who are reporting pressure,
20 working long hours, and quote, unquote, feeling like cockroaches
21 because they're dogged. What have you done since March to address
22 that issue? Have you gotten feedback from your employees? Have
23 you welcomed feedback? You said you didn't look at the time cards
24 for safety. So what have you done since then?

25 MR. RINEY: So specific to the feedback from the team

1 members, I look to my contract managers to provide that if there's
2 individuals that feel that they are having issues. I will
3 personally follow up with them to understand what specifically I
4 can do to help with that.

5 CHAIR HOMENDY: Well, do you know all those individuals said
6 that there was no feedback system in place for them to provide
7 that? If they don't feel, even if you have one, if they don't
8 feel they don't have a -- that they have a feedback system, how
9 you going to get that information? You're waiting for them to
10 come to you.

11 MR. RINEY: We will -- I will discuss with my managers to
12 ensure that they are soliciting that feedback.

13 CHAIR HOMENDY: Okay. Okay. Question. NTSB has received
14 reports of employees, Boeing employees, being isolated. Ms. Lund,
15 can you address that?

16 MS. LUND: I believe the employees that you're referring to
17 in this instance were moved off the line. After reviewing the
18 interviews and the information, the texts, or whatever, there was
19 information that there were two employees who were likely involved
20 in the opening of the plug, particularly based on what we referred
21 to earlier.

22 Their manager, their executive manager, the way these
23 decisions are made is by the executive manager. For example, I
24 would be involved if it were a quality employee. I believe the
25 NTSB got a statement from their executive manager. Made the

1 decision, which is a standard practice for Boeing. It's a
2 practice that we do frequently.

3 That when question arises about an employees involvement in a
4 safety related issue, we will move them to a lateral position,
5 same pay, same benefits, same shift, off the airplane while we
6 finish our investigation. And this is in the interest of airplane
7 safety. We do this as a practice when safety is involved.

8 And that is what occurred with these two employees. They
9 were moved maintaining pay, shift, benefits, off the airplane
10 while the investigation proceeded.

11 CHAIR HOMENDY: Are they in a lateral position? Or were they
12 put in a lateral position?

13 MS. LUND: They were put in a lateral position in terms of
14 pay, benefits, and shift. Currently they are, they are being paid
15 on administrative leave, but same pay and that was at their
16 request.

17 CHAIR HOMENDY: May I ask two more questions? Were they put
18 in something called building 420, building 421?

19 MS. LUND: 421 is the building where we build our wings.

20 CHAIR HOMENDY: Mm-hm.

21 MS. LUND: Yes, that is, that is the building instead of 420,
22 which is final assembly, the building next door is the wing
23 building. They were moved to the wing building.

24 CHAIR HOMENDY: Have you ever heard of that being called
25 Boeing prison because it seems to be something -- this is in the

1 transcript, seems to be something that is talked about.

2 MS. LUND: I did not see it called as Boeing prison. The
3 jobs that they went to do were reworking tooling. Their initial
4 project was to rework some tension barrier straps that have
5 tension in them. It's our tooling. It's an area that we use for
6 employees who can't perform their statement of work due to light
7 duty, or if we move them off the airplane.

8 But it's tooling rework, it's work that needs to be done by
9 our Boeing employees. And I will say I've been to that area.
10 I've seen that area. I'm familiar with that area. And I was not
11 familiar that they call it Boeing prison.

12 CHAIR HOMENDY: It's referred to in our transcripts as Boeing
13 prison in a cage. Does one of the individual work from home right
14 now?

15 MS. LUND: My understanding is both were both were -- both
16 are.

17 CHAIR HOMENDY: Both are. Okay. I'm going to come back to
18 this tomorrow when we get to safety culture. Member Graham.
19 Member Chapman. Member Inman.

20 MEMBER INMAN: A little bit more. If we can pull back up
21 11L, please, and go to page 73. Well, actually hang on to that.
22 That's fine. Just hold.

23 Mr. Riney, I'm just curious. At the very first of your
24 testimony, you started to say each day, and I think you were going
25 to say Excel, you get an Excel spreadsheet, maybe. Is that

1 correct?

2 MR. RINEY: It's a document that is provided by Boeing every
3 morning that details -- it's an Excel spreadsheet that details the
4 defects documented the previous day. And it's a way for us to,
5 because we don't have access to all of the Boeing systems --

6 MEMBER INMAN: Mm-hm.

7 MR. RINEY: -- it's a way for us to understand what work is
8 still remaining open.

9 MEMBER INMAN: And is that then put on what they call the
10 board? There was a lot of discussion about the board.

11 MR. RINEY: Yes. So again, because we don't have access to
12 the Spirit system in Boeing, we utilize a large monitor provided
13 by Boeing where the mechanics, contract mechanics, will utilize a
14 handheld scanner. Scan the printed out paperwork bar code. It
15 will auto populate, and it allows us to understand what mechanics
16 are working where within the factory.

17 MEMBER INMAN: And it's easy way for your people also to kind
18 of see who's had discussions with other people. They may put
19 notes in there or attach photographs.

20 MR. RINEY: There's no attachments.

21 MEMBER INMAN: Sorry.

22 MR. RINEY: Yeah, it's only notes of if they may be held for
23 access or waiting on a part, or that type of thing.

24 MEMBER INMAN: Okay. And so was that data, did we get to
25 review that information from the board?

1 MR. RINEY: I don't believe that was provided as part of
2 the --

3 MEMBER INMAN: Okay. Can we --

4 MR. RINEY: Investigation.

5 MEMBER INMAN: Go to page 73 on 11L, please. Go down to the
6 bottom and note, I'd note that this statement is taken on March
7 4th. It talks about the Spirit access board, where you make
8 notes. Question is, is it archived, you know, goes back each
9 month, you go back and try to find -- yes, I do know.

10 Recently, I think it was maybe two or three weeks ago, I
11 don't know what, somebody fumbled. But it deleted an amount of
12 data like two to three months. Then we started right back up.
13 You know how it auto saves some times. Mm-hm. They couldn't. I
14 think they only tracked it back to, like, January. The beginning
15 of January.

16 Was that data fumbled or erased? Or do you have any
17 information of where it might be?

18 MR. RINEY: Again, it was -- it's only, it's not a lot of
19 data. It's only for the manager to understand where the
20 individual is assigned. So it's not any kind of proprietary data,
21 it's not specific. It's mainly the line unit, and the NCR, and
22 the date that the mechanic -- it's more of a tracking system,
23 again, for where the mechanic worked that day.

24 Boeing has all that information available that they could
25 pull through the mechanics BEMS ID for when they stamp on the

1 paperwork. But this is more just a trace, tracing tool for the
2 managers to understand what was being worked on.

3 MEMBER INMAN: Do you remember when that data was fumbled?

4 MR. RINEY: Because I don't utilize it, it's mainly the
5 contract managers. It's not something that is tracked by me.
6 It's more, like I said, just a tool for my managers to understand
7 who's working where that day. It's not a significant part of our
8 process. It was just something that we put in place to help.

9 MEMBER INMAN: I'm done. Thanks.

10 CHAIR HOMENDY: Well, well, I'll check in a second, because
11 I'm hoping, Ms. Lund, can you clarify, sort of the shield in,
12 shield out process when you're on the factory floor?

13 MS. LUND: Yes, the shield process is the name of the process
14 we were referring to earlier, that when you walk into an area, if
15 it's not your home area, the employees who work there every day
16 are assumed to work there, but when you go to visit the area,
17 whether you are a contractor or someone working out of position,
18 or even a manager, when we come into the area, we use our badge
19 and we wand in the area. And then when we leave the area, we wand
20 out of the area. And that process that we used to do that is the
21 shield process.

22 CHAIR HOMENDY: Thank you. And the wandering in and wandering
23 out, what do you -- is it with your badge?

24 MS. LUND: It's a computer system. The baseline is it's the
25 badge. You use your badge, it comes up, it asks you what you're

1 doing in the area, what area you're going to be working on, what
2 you're going to be doing, and you fill that out and then you have
3 access to the area. And then when you leave, you check out
4 through that shield.

5 CHAIR HOMENDY: And do you need some sort of preapproval, or
6 you can go in and out depending on your work?

7 MS. LUND: It says if you're going to work on the aircraft
8 and it's a live aircraft, you need to touch base with the GC. As
9 I mentioned earlier, that check-in needs to happen. But from a
10 management perspective, when I check in, I say, you know, I'm
11 going to walk around the airplane or I'll be just walking, not
12 performing any work on the aircraft, and I can walk it.

13 CHAIR HOMENDY: And is there some sort of way to track who's
14 shielding in and shielding out? Where is that, where is that
15 kept?

16 MS. LUND: It's kept in the system from the shield data that
17 we use to go in and out. I will say there are times the system
18 goes down for whatever reason. Then we go back to a paper system,
19 and we keep the paper records also.

20 CHAIR HOMENDY: How long do you keep those records?

21 MS. LUND: I don't know the answer to that.

22 CHAIR HOMENDY: Understood. The reason why I'm asking is in
23 this case, if you were opening, removing, closing a door plug, you
24 would be entering an area where you would be shielding in and
25 shielding out -- or wandling in -- I'm trying to use the right --

1 MS. LUND: Yes, right. Yes. Any of those words will work,
2 yes, yes.

3 CHAIR HOMENDY: Okay. Yes. And so on these particular days,
4 do you know who shielded in and shielded out?

5 MS. LUND: We have a record of employees who were in the
6 area, yes.

7 CHAIR HOMENDY: Is there ever a time where somebody doesn't
8 shield in or shield out?

9 MS. LUND: Per process, they should, but I'm sure there is.
10 And as I said, employees who work in the area every day don't
11 shield in and shield out. But per process, if you're entering an
12 area that's not your home work area, you should use the shield
13 system or the documentation.

14 CHAIR HOMENDY: The reason why I'm asking is we had seen
15 throughout several interviews where some people don't shield out.
16 They might go to lunch, they may go to the restroom, they may go
17 on break. And so having that record, that's a process that
18 doesn't exist. So a record that does not exist, is that something
19 you've looked at, or you are looking at? Also a safety issue
20 but --

21 MS. LUND: Yeah, if you -- it's a good question. We track
22 particularly the entering in, so we know who's in the area. If
23 you don't shield out, your manager actually gets a notification
24 that this person didn't shield out, but that's several hours
25 later, or at the end of shift. I've gotten notifications at the

1 end of shift that someone didn't shield out of an area. You go
2 back, you check, you try to fix the record.

3 I don't know if we have an active improvement activity right
4 now on working, particularly as you mentioned, on the shield out,
5 the wand out process or all of it. I don't know if we have an
6 active improvement activity on it.

7 CHAIR HOMENDY: Okay. Thank you very much. And just one
8 more. Member Chapman had asked about the recording, the security
9 video. Have you changed the length of how long you keep that at
10 all?

11 MS. LUND: I believe today it is still 30 days.

12 CHAIR HOMENDY: Okay, great. Member Inman.

13 MEMBER INMAN: Just a quick question, and this is for -- I
14 often found people who are not involved with this so much like we
15 are. One thing that we have not mentioned is actually being able
16 to interview the door crew manager, and so that person is on a
17 medical leave. I think we've established that. Is that correct?

18 MS. LUND: That is correct.

19 MEMBER INMAN: And so it's not for any reason that anybody's
20 been withheld for that door crew manager.

21 MS. LUND: No.

22 MEMBER INMAN: And I think, I think our investigators have
23 verified that as well.

24 MS. LUND: That's right. And that manager is still on leave
25 of absence.

1 MEMBER INMAN: Completely understand. One other question,
2 this may be about production itself, and going back just a little
3 bit. We talked about when the door plug was originally created
4 and put in, it looks like it's at the start, or sorry, not the
5 door plug. When an open hole for a door plug, it started with the
6 Max line itself. Has anyone ever ordered it with the emergency
7 exit?

8 MS. LUND: To clarify your words, with a working door?

9 MEMBER INMAN: Yes.

10 MS. LUND: Yes.

11 MEMBER INMAN: A lot, a little.

12 MS. LUND: I don't believe it's most, but we have airplanes
13 in our line regularly that have the working door.

14 MEMBER INMAN: Is that something --

15 MS. LUND: We have certain customers that order a lot of
16 airplanes that have the working door, yeah.

17 MEMBER INMAN: Spirit, is that something that's also --
18 you're reworking some of your procedures in regard to what we're
19 seeing now? That may have been a confusing question.

20 MR. RINEY: So if I understand you correctly, the door plugs,
21 and all doors were part of an enhanced inspection process that
22 Spirit began performing.

23 MEMBER INMAN: The reason I mentioned it during the earlier
24 display with some of your representatives, they showed a graphic
25 of a plane and what was in blue was Spirit's. But the entry exit

1 door, the main passenger door, was not in blue, it was in white.
2 And I think we clarified that you also manufacture it. You just
3 don't design it.

4 MR. RINEY: So there's -- correct. There's design
5 responsibility for certain parts of the fuselage. And the forward
6 entry door is one that Boeing has the design responsibility for.
7 The other passenger doors and access doors, Spirit has design
8 responsibility for.

9 MEMBER INMAN: If you have the design responsibility for the
10 door plugs, going back to Vaseline versus dishwater soap, are you
11 responsible for that portion of the overall input or is it
12 something Boeing is?

13 MR. RINEY: I would have to follow up with our team to ensure
14 that -- if that's something that that we -- is part of a planning
15 operation or part of a specification for what lubricants are
16 allowed to be used.

17 MEMBER INMAN: Just in general, okay. That's all I got.

18 CHAIR HOMENDY: I just wanted to clarify two things.
19 Training for the door crew. In 2020, you mentioned, Ms. Lund,
20 foundational training and on the job training. In 2023, was there
21 recurrent training? Or is it all on the job after you do the
22 foundational at that time?

23 MS. LUND: We have some level of recurrent training across
24 the board. There are certain courses that are recurrent. In
25 terms of door crew specific, the majority of the training is on

1 the job. I cannot answer with certainty right now whether there
2 are certifications. If it takes a certification to do a job, that
3 is a recurrent training. I cannot, I cannot answer that
4 specifically.

5 CHAIR HOMENDY: All right.

6 MS. LUND: Maybe our friends can, but I can't. I'm sorry.

7 CHAIR HOMENDY: Thank you for that. And my last question is
8 how do you prioritize work on flow days when there is rework? Is
9 it constant reprioritizing? How does that work?

10 MS. LUND: Yes. That's part of the negotiation we do. In
11 each of our flow days, we have, as I mentioned, sort of a critical
12 path, a specific statement of work. Those are the ones that will
13 be prioritized because they're the airplanes that has a strong
14 precedent network to the follow on jobs.

15 So that will tend to be a priority. Anything that needs to
16 be done in position due to a product safety or personal safety
17 issue, will be prioritized in that position. For example, there
18 are some areas where it becomes very difficult to access the
19 airplane once you move out of the structural tool, to get on top
20 of the airplane. So that we like to do in position.

21 Those would be the things that we would prioritize first, and
22 those are the kinds of elements that will drive the elevation in
23 that SAT system as well. If something really needs help because
24 we need it done before it needs to move to the next position, that
25 would be an elevated issue in the SAT. So we prioritize it based

1 on critical jobs, critical flow of jobs, personal safety, product
2 safety.

3 CHAIR HOMENDY: Okay, thank you. Member Brown has about
4 seven questions that if it's okay with you, I'm -- we're going to
5 -- the investigative team will send them in writing. You can
6 provide a written response maybe within seven days. Does that
7 sound reasonable?

8 MS. LUND: That sounds very reasonable.

9 CHAIR HOMENDY: And then we'll put it publicly in the docket
10 for people to review. Is that all right?

11 MS. LUND: Happy to do that.

12 CHAIR HOMENDY: Perfect. Back to the technical panel in case
13 you have some follow up questions. We're good, right, over here,
14 yeah, great.

15 MEMBER GRAHAM: No further questions, Chair.

16 CHAIR HOMENDY: Parties, do you have any question -- further
17 questions for this panel? ALPA.

18 MR. JENGELIS: No, ma'am.

19 CHAIR HOMENDY: Alaska.

20 MR. TIDWELL: No, ma'am.

21 CHAIR HOMENDY: AFA.

22 MR. HEIPLE: Not at this moment.

23 CHAIR HOMENDY: Mr. Gerlach.

24 MR. GRABON: Thank you, no, Chair.

25 CHAIR HOMENDY: Okay, and IAM.

1 MR. HOLDEN: Thank you. I just have a follow up on the
2 discussion around isolation of the two door crew.

3 Did the company evaluate and isolate any managers that failed
4 to identify that a removal was to occur?

5 MS. LUND: The manager would have been evaluated. It would
6 have been the door crew manager, who is out on medical leave. By
7 definition, he was already not working on the airplane so that
8 evaluation process did not happen.

9 MR. HOLDEN: We saw in the SAT documentation other managers
10 that were engaged in the discussion about whether a removal was
11 required. So there was other employees that were engaged in that.
12 Were any of those investigated?

13 MS. LUND: I believe we -- and I'm speaking for my colleague,
14 as I'm stating from his statement on behalf of Boeing. I believe
15 they looked at the group of employees that per the data, the
16 collective set of data, appeared to have been noted as involved in
17 or asked to open the plug. It was that group of employees that
18 were reviewed.

19 MR. HOLDEN: Thank you. No further questions.

20 CHAIR HOMENDY: Thank you very much. And Spirit.

21 MS. MEYER: No further questions, Chair.

22 CHAIR HOMENDY: So no further questions from the parties.
23 Technical panel is okay. Board of inquiry. All right. That
24 concludes panel two. and day one of this investigative hearing.
25 So on behalf of the Board of Inquiry and the technical panel, I

1 want to thank all the parties for their participation.

2 I really want to thank the witnesses. I know it was a very
3 long day. We appreciate your patience. Appreciate your being
4 forthright with your answers to your questions. And just as a
5 final reminder, we ask that all witnesses be present for the
6 entire hearing, again, both days. So please be here back in the
7 boardroom unless you've coordinated in advance with the hearing
8 officer, you may be recalled.

9 I don't believe we have any new exhibits. Correct. All
10 right. The transcripts are scheduled to be available within seven
11 days of the completion of the hearing. As a safety agency, we
12 certainly take fatigue very, very seriously. So just a reminder
13 for the Board of Inquiry, to refrain from contacting NTSB staff
14 after we leave here today so that they can get some sleep and rest
15 and be prepared for tomorrow.

16 But if you have additional questions or need assistance, Tim
17 LeBaron, Donna Schultze, Dave Helson, and Brian Curtis are
18 available to help you. To the technical team, you did an
19 excellent job. Thank you. I hope you do get home tonight and get
20 some rest. We stand adjourned until 9:00 a.m. tomorrow.

21 (Whereupon, the hearing in the above-entitled matter was
22 adjourned, to reconvene at 9:00 a.m. on August 7, 2024.)
23
24
25

CERTIFICATE

This is to certify that the attached proceeding before the
NATIONAL TRANSPORTATION SAFETY BOARD

IN THE MATTER OF: ALASKA AIRLINES BOEING 737-9 MAX
LEFT MID-EXIT DOOR PLUG SEPARATION
NEAR PORTLAND, OREGON
ON JANUARY 5, 2024

ACCIDENT NO.: DCA24MA063

PLACE: Washington, D.C.

DATE: August 6, 2024

was held according to the record, and that this is the original,
complete, true and accurate transcript which has been transcribed
to the best of my skill and ability.



Sandra Hirsch
Transcriber