

## **MAX(imum) Decline - Disaster Breakdown Episode 163**

### **References and Additional Notes**

For ease of reference and further reading I have attached a number of notable reports to the top of this list. The two accident reports, Lion Air 610, Ethiopian Airlines 302, Final Committee Report into the MAX accidents and the Alaska 1282 Preliminary Report have been attached to the top of this list.

#### **Lion Air Flight 610 - Final Accident Report:**

<https://www.aaiu.ie/sites/default/files/FRA/2018%20-%20035%20-%20PK-LQP%20Final%20Report.pdf>

#### **Ethiopian Airlines - Final Accident Report:**

[https://avherald.com/files/ethiopian\\_b38m\\_et-avj\\_190310\\_final\\_report\\_20221226.pdf](https://avherald.com/files/ethiopian_b38m_et-avj_190310_final_report_20221226.pdf)

#### **Final Committee Report:**

<https://democrats-transportation.house.gov/imo/media/doc/2020.09.15%20FINAL%20737%20MAX%20Report%20for%20Public%20Release.pdf>

#### **Alaska Airlines Flight 1282 - Preliminary Report:**

<https://www.nts.gov/investigations/Documents/DCA24MA063%20Preliminary%20report.pdf>

**If you want a video (from an experienced piloting professional) that explains all of the intricacies of MCAS please check out The Boeing 737 Technical Channel here on YouTube. See this video:**

[https://www.youtube.com/watch?v=JApoVC6iIE&ab\\_channel=TheBoeing737TechnicalChannel](https://www.youtube.com/watch?v=JApoVC6iIE&ab_channel=TheBoeing737TechnicalChannel)  
and:

[https://www.youtube.com/watch?v=bljlduBx1TE&ab\\_channel=TheBoeing737TechnicalChannel](https://www.youtube.com/watch?v=bljlduBx1TE&ab_channel=TheBoeing737TechnicalChannel)

**This channel also has a good discussion about what happened with ASA1282:**

[https://www.youtube.com/watch?v=DYItSd3kWX0&ab\\_channel=TheBoeing737TechnicalChannel](https://www.youtube.com/watch?v=DYItSd3kWX0&ab_channel=TheBoeing737TechnicalChannel)

#### **Part I: Lion Air 610**

[1] 737, still the best selling aircraft the world over:

<https://www.linkedin.com/pulse/top-5-most-produced-commercial-aircraft-history-flyware-labs-beqzc#:~:text=The%20737%20is%20operated%20by,selling%20modern%20jet%20aircraft%20globally.>

[2] See more information and specifications regarding the four Max variants here:

<https://www.boeing.com/commercial/737max#technical-specs>

[3] Orders for the 737 Max from Boeing: <https://www.boeing.com/commercial/#orders-deliveries>

[4] Captain's Flight Experience is noted in the Lion Air Accident report under the personnel section. Same as First officer, see the attached report at the top of the reference page.

- [5] Comments from the First Officer's training in the accident report:  
<https://www.aaiu.ie/sites/default/files/FRA/2018%20-%20035%20-%20PK-LQP%20Final%20Report.pdf> pg29
- [6] Flight Data Recording - Lion Air 610 Accident Report pg77 - Will also be worth seeing the noted previous flight FDR on the preceding pages
- [7] AOA sensor information - Lion Air 610 Accident Report pg43
- [8] Angle of Attack as a Principal of Flight. I deferred to my own personal flight training and general aviation knowledge. But if you would like to learn more about AoA, you can watch this video here: [https://www.youtube.com/watch?v=t0tCRq2JedY&ab\\_channel=flight-club](https://www.youtube.com/watch?v=t0tCRq2JedY&ab_channel=flight-club)
- [9] Critical discrepancy between the two AOAs - Lion Air Accident Report pg19
- [10] First Officer Comment - Lion Air Accident Report pg20
- [11] First Officer notices the altimeters don't agree - Lion Air Accident Report pg20
- [12] Correspondence between the Pilots and ATC in regards to troubleshooting the Altitude: Accident Report pg20
- [13] Correspondence between the pilots and ATC in regards to a "Flight Control Problem" - Accident Report pg21
- [14] The onset of the Flight Control problem can be easily tracked in the FDR data. See Reference 6
- [15] ADS-B data - FlightRadar24:  
<https://www.flightradar24.com/blog/flightradar24-data-regarding-lion-air-flight-jt610/>
- [16] Chris Brady of the 737 technical site has a fantastic video that explores the workings of how MCAS operated on the accident flights and talks at length about this "10 seconds on, 5 seconds off" pattern:  
[https://www.youtube.com/watch?v=JApoVC6iIE&ab\\_channel=TheBoeing737TechnicalChannel](https://www.youtube.com/watch?v=JApoVC6iIE&ab_channel=TheBoeing737TechnicalChannel)
- [17] Footage taken of the Crash site: [https://en.wikipedia.org/wiki/File:Lion\\_Air\\_crash\\_site.webm](https://en.wikipedia.org/wiki/File:Lion_Air_crash_site.webm)
- [18] Accident Plane's AoA Malfunction History - Lion Air Accident Report pg34
- [19] AOA part ordered from "Batam Aero Technique" - Lion Air Accident Report pg36 <-- There is also a timeline here of how the AoA part was removed from a 737-900. It's all very interesting but I really need to move the video along.
- [20] Mechanic failed to calibrate the new AoA sensor - Air Crash Investigation, Season 21, Episode 4: Grounded: Boeing Max 8
- [21] Lion Air Flight 043 FDR - Lion Air Flight 610 Accident Report pg74
- [22] See the section on Lion Air 043 in the report pg165
- [23] Non-Normal Checklist - Runaway Stab Trim - Lion Air Flight 610 Accident Report pg116

#### -The Boeing 737 Family-

- [24] The Boeing 707 was the most successful jetliner of its generation. Over 1000 of them were built (including Boeing 720s). This plane massively outsold the DC-8, the next closest competitor. See the 707 order history here:  
<https://web.archive.org/web/20150904102020/http://active.boeing.com/commercial/orders/displaystandardreport.cfm?cboCurrentModel=707&optReportType=AllModels&cboAllModel=707&ViewReportF=View+Report>
- [25] 727 Archive Footage: <https://archive.org/details/PlaneTal1965>

[26] Eastern Airlines Boeing 727 Commercial, 1965:

[https://www.youtube.com/watch?v=4awl8tJlqv8&ab\\_channel=ClassicAirliners%26VintagePopCulture](https://www.youtube.com/watch?v=4awl8tJlqv8&ab_channel=ClassicAirliners%26VintagePopCulture)

[27] Boeing Falling Behind Douglas: [https://en.wikipedia.org/wiki/Boeing\\_737](https://en.wikipedia.org/wiki/Boeing_737) <-- See the Initial Design chapter. Also see this website: <http://www.b737.org.uk/> <-- also full of incredible information that I cite later in this segment

[28] Additional 727 Information - I consulted a few different sources for 727 knowledge (admittedly not a plane I know much about) A)

<https://www.motoart.com/studio/airplane-history/aircraft-history-of-the-b-727#:~:text=The%20first%20B%2D727%20took,727%20to%20use%20short%20runways> . B)

<https://simpleflying.com/boeing-727-rise-fall-story/> C) (Video by Mentour Pilot):

[https://www.youtube.com/watch?v=8ep79Q9F4cs&ab\\_channel=MentourNow%21](https://www.youtube.com/watch?v=8ep79Q9F4cs&ab_channel=MentourNow%21)

[29] 727 Specifications: [https://en.wikipedia.org/wiki/Boeing\\_727#Specifications](https://en.wikipedia.org/wiki/Boeing_727#Specifications)

[30] DC9 Specifications: [https://en.wikipedia.org/wiki/McDonnell\\_Douglas\\_DC-9#Specifications](https://en.wikipedia.org/wiki/McDonnell_Douglas_DC-9#Specifications)

[31] NYT on Boeing's Plan to introduce a smaller plane:

<https://www.nytimes.com/1964/07/17/archives/transport-news-boeing-plans-jet-shorthaul-models-studied-appeal-set.html>

[32] Similarities between Boeing 727 and 737: <http://www.b737.org.uk/history.htm> - Heritage Section

[33] Joe Stutter on Designing the Boeing 737: <http://www.b737.org.uk/history.htm>

[34] Deep Stall:

<https://skybrary.aero/articles/deep-stall#:~:text=Definition.Deep%20Stall%20might%20be%20unrecoverable>.

[35] Nolinor Aviation still have 737-200s in their fleet today! For the purpose of arctic flights:

<https://www.planespotters.net/airline/Nolinor-Aviation>

[36] I combined all variants of the 737 Original to get a round about figure of about 1100. This includes commercial, freighter and military variants. See the order breakdown on the wiki page:

[https://en.wikipedia.org/wiki/Boeing\\_737#Orders\\_and\\_deliveries](https://en.wikipedia.org/wiki/Boeing_737#Orders_and_deliveries)

[37] One commenter on this old forum thread I think put it best:

<https://www.airliners.net/forum/viewtopic.php?t=1449831> "When the 757 was announced, the 737 NG was not yet in existence, MD was still the competition, and so was Airbus. So, from the standpoint of Boeing's lineup at the time, the 757 was the 727 replacement - albeit with far greater capability."

[38] Airbus now calls the older a320s the a320ceo. Learn more about it including its engines here:

<https://aircraft.airbus.com/en/aircraft/a320-the-most-successful-aircraft-family-ever/a320ceo>

[39] I was being stupid here. The CFM56 engine was actually an exclusive variant of the engine with some changes (CFM56-7B). Main point still stands, it's a last gen engine:

<https://www.cfmaeroengines.com/engines/cfm56/>

[40] Exit Limit Details:

[https://www.fire.tc.faa.gov/2022Conference/files/Cabin\\_Safety\\_III/BebenExitOperationLocation/Beben\\_ExitOperationLocation\\_Pres.pdf](https://www.fire.tc.faa.gov/2022Conference/files/Cabin_Safety_III/BebenExitOperationLocation/Beben_ExitOperationLocation_Pres.pdf) ← There actually is a lot of stuff that goes into

determining the exit limit of an aircraft. This is a nice bit of info to read up on.

[41] Considering it was in the news recently. I shall point towards the Preliminary Report issued by the NTSB regarding Alaska 1282. it gives a quick breakdown of the MED Plugs:

<https://www.nts.gov/investigations/Documents/DCA24MA063%20Preliminary%20report.pdf>

<-- pg4 Also consider watching this great video from Chris Brady:

[https://www.youtube.com/watch?v=maLBGFYI9\\_o&ab\\_channel=TheBoeing737TechnicalChannel](https://www.youtube.com/watch?v=maLBGFYI9_o&ab_channel=TheBoeing737TechnicalChannel)

-Maximum Decline-

[42] The Max was introduced by Malindo Air (Connected to Lion Air in fact):

<https://www.flightglobal.com/orders-and-deliveries/malindo-operates-worlds-first-737-max-flight/124109.article>

[43] 2010 Article regarding the new A320neo:

<https://www.ainonline.com/aviation-news/air-transport/2010-12-01/airbus-launches-a320neo>

[44] CFM Leap development announcement in 2008:

<https://www.cfmaeroengines.com/press-articles/cfm-unveils-new-leap-x-engine/>

[45] TC-LSD (Aircraft shown in video): <https://www.airfleets.net/ficheapp/plane-a321-8727.htm>

<-- I had to check which engine this was, it's the PW1100

[46] Bombardier C-Series: <https://skybrary.aero/aircraft-family/bombardier-cseries>

[47] Airbus Acquires the C-Series and re-brands it as the A220:

<https://simpleflying.com/bombardier-c-series-airbus-a220-transition-story/>

[48] Atmosphere change at Boeing following merger with McDonnell Douglas:

<https://qz.com/1776080/how-the-mcdonnell-douglas-boeing-merger-led-to-the-737-max-crisis>

[49] MD80 and MD90 production ceased in 1999 and 2000 respectively:

<https://simpleflying.com/md-80-1999-delivery/> <-- TWA received the final MD80 in the closing days of 1999. FeelsBadMan

[50] Boeing Laying off up to 30,000 employees, article from 2001:

<https://edition.cnn.com/2001/US/09/18/gen.boeing.layoffs/#:~:text=Mulally%20called%20the%20layoffs%20a,by%20the%20end%20of%202002>. - Seattle times on the same thing:

<https://www.seattletimes.com/seattle-news/the-decline-of-boeing-jobs/>

[51] Boeing sold off its arm that became Spirit AeroSystems in 2005:

<https://www.barrons.com/articles/boeings-stock-spirit-aero-wall-street-f2ca565d>

[52] The 737NG sold remarkably well. See the order breakdown on the wiki page:

[https://en.wikipedia.org/wiki/Boeing\\_737\\_Next\\_Generation#Orders\\_and\\_deliveries](https://en.wikipedia.org/wiki/Boeing_737_Next_Generation#Orders_and_deliveries)

[53] This video:

[https://www.youtube.com/watch?v=069y1MpOkQY&ab\\_channel=WendoverProductions](https://www.youtube.com/watch?v=069y1MpOkQY&ab_channel=WendoverProductions) <-- by Wendover Productions still stand the test of time, in giving a concise breakdown of how low cost airlines work and how they streamline their operations to save money.

[54] Easyjet switching to Airbus:

<https://simpleflying.com/easyjet-boeing-to-airbus/#:~:text=October%202002%20saw%20easyJet%20make,supplier%20from%20Boeing%20to%20Airbus>.

[55] KLM Fleet Restructuring:

<https://news.klm.com/klm-group-chooses-airbus-a320neo-family-for-klm-and-transavias-european-fleet/>

[56] According to the A320neo Wiki Page:

[https://en.wikipedia.org/wiki/Airbus\\_A320neo\\_family#Orders\\_and\\_deliveries](https://en.wikipedia.org/wiki/Airbus_A320neo_family#Orders_and_deliveries) <-- Airbus was taking orders as early as 2010, before the Max was announced

[57] The old video by Vox does this cool thing where they put the two planes side by side and it's just a great visualization. Just wanted to make it clear where I drew this from. You can see it here: [https://www.youtube.com/watch?v=H2tuKiiznsY&t=281s&ab\\_channel=Vox](https://www.youtube.com/watch?v=H2tuKiiznsY&t=281s&ab_channel=Vox)

[58] The repositioning of the engines on the 737 Max is well documented: Air Crash Investigation, Season 21, Episode 4: Grounded: Boeing Max 8 <--- In this episode of ACI, an investigator really makes a good point about the landing gear wheel wells.

[59] Mentour pilot recently made a great video about this recently and emphasizes the same points I make during this section:

[https://www.youtube.com/watch?v=ue400BhW0aY&ab\\_channel=MentourNow%21](https://www.youtube.com/watch?v=ue400BhW0aY&ab_channel=MentourNow%21)

[60] The Pitching up tendency violated the Code of Regulations - 14 CFR § 25.203 Stall Characteristics:

<https://www.ecfr.gov/current/title-14/chapter-I/subchapter-C/part-25/subpart-B/subject-group-ECFR1cd58fc7d4bfee0/section-25.203>

[61] <https://www.nytimes.com/2019/06/01/business/boeing-737-max-crash.html>

[62] 707 "MCAS". Actually, the early Pitch Augmentation system on the 707 was very basic that nudged the nose down. You can read up more about it and the UK regulatory requirement that birthed it here:

<https://leehamnews.com/2019/11/01/a-basic-mcas-system-was-installed-in-the-boeing-707-in-the-1960s/>

[63] Collins Aerospace did the Software Coding for the Max MCAS:

<https://www.thedoanlawfirm.com/blog/2019/october/update-on-the-boeing-737-max-aviation-disasters/>

[64] MCAS, not necessarily an stall prevention system:

<https://www.cbsnews.com/live-news/faa-hearing-today-live-stream-updates-boeing-737-max-8-mcas-senate-commerce-committee-2019-03-27/>

[65] Requirements for MCAS to activated, talked about in this lecture:

[https://www.youtube.com/watch?v=S-egJqYjjMw&ab\\_channel=RoyalAeronauticalSociety](https://www.youtube.com/watch?v=S-egJqYjjMw&ab_channel=RoyalAeronauticalSociety)

[66] MCAS Override and the situation regarding Lion Air is discussed in the Air Crash Investigation Episode - Season 21, Episode 4: Grounded: Boeing Max 8

[67] MCAS Switching between AoA Sensors: Lion Air Flight 610 Accident Report pg 48. Also see pg195 section 2.5.1.3 on how the MCAS by default feeds from the left systems.

[68] Boeing with approval from the FAA removed mention of MCAS from the FCOM:

<https://democrats-transportation.house.gov/imo/media/doc/2020.09.15%20FINAL%20737%20MAX%20Report%20for%20Public%20Release.pdf> pg20

[69] Boeing attempting to blame "Foreign Trained Pilots":

<https://democrats-transportation.house.gov/imo/media/doc/2020.09.15%20FINAL%20737%20MAX%20Report%20for%20Public%20Release.pdf> pg142

[70] As to the reference listed in the report regarding this point:

<https://www.govinfo.gov/content/pkg/CHRG-116hhrg38282/pdf/CHRG-116hhrg38282.pdf>

[71] Boeing Emphasizing compliance of NNC checklists: PRELIMINARY REPORT:

[https://reports.aviation-safety.net/2018/20181029-0\\_B38M\\_PK-LQP\\_PRELIMINARY.pdf](https://reports.aviation-safety.net/2018/20181029-0_B38M_PK-LQP_PRELIMINARY.pdf) pg26

[x] Indonesian investigators conclude that MCAS was not of a fail safe design: Lion Air Accident Report pg 199 ← Didn't need this in the video, I felt I made the point clear but just to cover all bases. Indonesian investigators concluded the 737 Max was not of fail safe design.

[72] Boeing's messages:

<https://www.businessinsider.com/boeing-737-max-employee-called-lion-air-idiot-training-request-2020-1?r=US&IR=T>

[73] "wouldn't let their families fly on a Max":

<https://www.businessinsider.com/boeing-employees-wouldnt-let-families-fly-on-737-max-2020-1?r=US&IR=T>

[74] "Designed by clowns, supervised by monkeys": (a)

<https://fortune.com/2020/01/10/designed-clowns-supervised-monkeys-internal-boeing-messages-slam-737-max/> (b) <https://www.nytimes.com/2020/01/09/business/boeing-737-messages.html>

-Ethiopian Airlines 302-

[75] Ethiopian Airlines ordered dozens of Maxs:

<https://simpleflying.com/ethiopian-airlines-boeing-order-dubai-airshow-2023/>

[76] Fleet age of the airline, about seven years according to this document:

[https://corporate.ethiopianairlines.com/docs/default-source/ethiopian-factsheet/november---2023-factsheet.pdf?sfvrsn=a9ea0e5b\\_2#:~:text=Currently%2C%20the%20airline%20has%20a,100%20ultramodern%20aircraft%20on%20order.&text=than%20any%20other%20airline.](https://corporate.ethiopianairlines.com/docs/default-source/ethiopian-factsheet/november---2023-factsheet.pdf?sfvrsn=a9ea0e5b_2#:~:text=Currently%2C%20the%20airline%20has%20a,100%20ultramodern%20aircraft%20on%20order.&text=than%20any%20other%20airline.) -

Additionally, the airline has just ordered the new 777-9:

<https://twitter.com/airwaysmagazine/status/1765054122804564415>

[77] ET-AVJ Maintenance Log - Ethiopian Airlines 302 Accident Report pg40

[78] Captain's career history is noted in the Accident Report pg32

[79] First Officer's career history is noted in the Accident Report pg33

[80] The Trim Wheel makes a very distinctive sound. Investigators would have immediately noticed this on the tape. See the CVR Appendix in the report

[81] AOA indications, part of the timeline events in the Accident Report pg21

[82] FDR Data - Accident Report pg128 - Figure 68

[83] Symptoms of the AoA Failure are well documented in the report. See Reference 82 to observe the clear picture.

[84] Autopilot Status - Immediately after take-off they attempted to engage the autopilot, it had a tendency to disconnect due to the onset of the AoA failure. There was however a period of about 32 seconds where the Autopilot was engaged. MCAS did not intervene here as this check was not met. See the Accident Timeline - Ethiopian Airlines Flight 302 Accident Report pg20

[85] Autopilot as per the FCTM - Accident Report pg221-222

[86] Investigator's comments about the Captain's interpretation of guidance - Accident Report pg222

[87] First Activation of MCAS at 8:40 - Accident Report pg25

[88] Stab Trim Cutout to override MCAS - Accident Report pg27

[89] The strenuous effort needed to trim the plane is well documented in the report. See Finding 14 pg247 in the Conclusion where it is mentioned that the A/T did not work as it was supposed to. The CVR Transcript where the pilot's exhaustion is evident.

[90] CVR Transcript - Ethiopian Airlines Flight 302 Accident Report from pg94



[91] It is the opinion of investigators that the Stab Trim Cutout Switches were flipped back to the normal setting. Made evident by the captain's comments on the CVR "Put them up" in reference to the switches

[92] Final MCAS Activation - Ethiopian Airlines Flight 302 Accident Report pg

[93] ETH302 Flight Path:

<https://leehamnews.com/2019/03/15/bjorns-corner-the-ethiopian-airlines-flight-302-crash/>

[94] Investigator's Findings - Ethiopian Airlines Flight 302 Accident Report pg255

[95] My old ass tweet: [https://twitter.com/Chloe\\_HowieCB/status/1104782507764051968](https://twitter.com/Chloe_HowieCB/status/1104782507764051968)

[96] A Contemporary news piece to emphasize my point:

<https://edition.cnn.com/2019/03/10/africa/ethiopian-airlines-crash-boeing-max-8-intl/index.html>

-Groundings-

[97] China Grounds the Max:

<https://theaircurrent.com/aviation-safety/chinas-aviation-regulator-orders-grounding-of-737-max/>

[98] Indonesia Grounds the Max:

[http://www.xinhuanet.com/english/2019-03/19/c\\_137905422.htm](http://www.xinhuanet.com/english/2019-03/19/c_137905422.htm)

[99] EASA Ground the Max:

<https://www.easa.europa.eu/en/newsroom-and-events/press-releases/easa-suspends-all-boeing-737-max-operations-europe> Also see the printout in the ETH302 Report pg283

[100] CAA Grounds the Max:

<https://web.archive.org/web/20190313144139/http://publicapps.caa.co.uk/docs/33/SD2019001.pdf>

[101] EASA's 737 Max certification:

<https://www.easa.europa.eu/en/newsroom-and-events/press-releases/easa-declares-boeing-737-max-safe-return-service-europe>

[102] Ryanair's 737 Max 200:

[https://www.youtube.com/watch?v=kFQZKngyWHQ&ab\\_channel=SimpleFlying](https://www.youtube.com/watch?v=kFQZKngyWHQ&ab_channel=SimpleFlying)

[103] FAA initially said the Max was safe to fly:

<https://web.archive.org/web/20190409170040/https://www.channelnewsasia.com/news/world/us-says-boeing-737-max-safe-to-fly-after-ethiopia-crash-11334256>

[104] FAA Grounds the Max:

[https://web.archive.org/web/20190313222334/https://www.faa.gov/news/updates/media/Emergency\\_Order.pdf](https://web.archive.org/web/20190313222334/https://www.faa.gov/news/updates/media/Emergency_Order.pdf)

[105] Sully's Words:

<https://democrats-transportation.house.gov/imo/media/doc/2020.09.15%20FINAL%20737%20MAX%20Report%20for%20Public%20Release.pdf> pg11

[119] I forgot to add this reference in the numbering sequence. As I've not realized I left it out, I've gone back and added it in. So these words... "Motivated by money first, engineering seconds" are paraphrased from noted aviation analyst, John Nance, in an interview done in February 2024 on a Seattle Radio Station

[106] Boeing's Max Production during the grounding:

[https://en.wikipedia.org/wiki/Boeing\\_737\\_MAX#Orders\\_and\\_deliveries](https://en.wikipedia.org/wiki/Boeing_737_MAX#Orders_and_deliveries) <-- the infographic on the wikipedia page is really good. You can easily visualize the slowing orders, deliveries and cancellations of the Max.

- [107] Boeing's fixes to MCAS: <https://www.boeing.com/737-max-updates/mcas/>
- [108] Other changes made to the Max:  
<https://www.boeing.com/737-max-updates/additional-updates/>
- [109] \$20,000,000,000 Figure:  
<https://edition.cnn.com/2020/11/17/business/boeing-737-max-grounding-cost/index.html>
- [110] 737 Max returning to service:  
<https://www.cnet.com/tech/tech-industry/boeing-737-max-8-all-about-the-aircraft-flight-ban-and-investigations/>
- [111] Cancellation of Max Planes:  
<https://www.reuters.com/article/us-boeing-deliveries-idUSKBN29H28M/>
- [112] Discussions about the 737s future are happening right now. mentour Pilot did a great video covering this: <https://www.youtube.com/watch?v=8ep79Q9F4cs> but you can find other discussions elsewhere, forum threads from pilots and such.
- [113] Bubbling QA issues with the Max:  
<https://edition.cnn.com/2023/12/28/business/boeing-737-max-loose-bolt/index.html>
- [114] Max 9 Introduction: <http://www.b737.org.uk/737max9.htm>
- [115] Max7 and Max 10 Certification has been infamously delayed as of late:  
<https://leehamnews.com/2024/01/22/certifications-of-max-7-and-10-may-take-hit-from-737-9-grounding/#:~:text=Certification%20of%20the%20MAX%207,of%20the%20composite%20engine%20nacelle.>
- [116] Plug Door offers a higher passenger comfort - Alaska Airlines Flight 1282 Preliminary Report pg4
- [117] My stupid tweet: [https://twitter.com/Chloe\\_HowieCB/status/1743586712406675872](https://twitter.com/Chloe_HowieCB/status/1743586712406675872)
- [118] Annex 13:  
[https://www.icao.int/Meetings/AMC/MA/Directors%20General%20of%20Civil%20Aviation%20Conference%20on%20a%20Global%20Strategy%20for%20Aviation%20Safety%20\(DGCA-06\)/Annex13attE\\_en.pdf](https://www.icao.int/Meetings/AMC/MA/Directors%20General%20of%20Civil%20Aviation%20Conference%20on%20a%20Global%20Strategy%20for%20Aviation%20Safety%20(DGCA-06)/Annex13attE_en.pdf)
- Alaska Airlines Flight 1282-
- [120] Logged flight time of accident plane:  
<https://www.flightradar24.com/blog/alaska-airlines-737-9-max-exit-door-separates-in-flight/>
- [121] Alaska Flight Crew Experience - Preliminary Report pg2
- [122] Alaska 1282 ATC Recording:  
[https://www.youtube.com/watch?v=PCsgZ81m6yU&t=137s&ab\\_channel=AvocadoFlight](https://www.youtube.com/watch?v=PCsgZ81m6yU&t=137s&ab_channel=AvocadoFlight)
- [123] If you would like to learn more about Cabin Pressurization, a good jumping off point would be this video by Airspace:  
[https://www.youtube.com/watch?v=Ulf1NGvv6m0&ab\\_channel=Airspace](https://www.youtube.com/watch?v=Ulf1NGvv6m0&ab_channel=Airspace)
- [124] Aircraft doors exploiting the pressure differential of flight conditions:  
<https://simpleflying.com/aircraft-doors/>
- [125] FDR Timeline - Preliminary Report pg3-4
- [126] Pilot's account of what happened at the moment of failure - Preliminary Report pg3
- [127] Chris Brady in this video:  
[https://www.youtube.com/watch?v=DYItSd3kWX0&ab\\_channel=TheBoeing737TechnicalChann](https://www.youtube.com/watch?v=DYItSd3kWX0&ab_channel=TheBoeing737TechnicalChann)



el <-- He talks about how the time from failure to descent is reasonable given the circumstances.

[128] NTSB photographs:

<https://www.nts.gov/investigations/Documents/DCA24MA063%20Preliminary%20report.pdf>

pg2 and pg9

[129]

<https://www.dailymail.co.uk/news/article-12946297/teen-passenger-alaska-airlines-1282-flight-to-ok-selfie-moments-shirt-sucked-body.html>

[130] Cockpit Voice Recorders do not record forever. They are programmed to loop the recording over themselves to save on storage. Learn more about them here:

<https://edition.cnn.com/2024/01/08/us/ntsb-chair-calls-for-longer-memory-in-cockpit-voice-records/index.html>

[131] Initial reports start to come out: a)

<https://www.ktvu.com/news/alaska-airlines-flight-out-of-portland-involved-in-incident-emergency-landing-reported> b)

<https://www.oregonlive.com/portland/2024/01/scary-incident-forces-alaska-airlines-flight-back-to-pdx.html> c)

<https://www.washingtonpost.com/travel/2024/01/05/alaska-airlines-plane-emergency-landing-portland/>

[132] Example of one video circulating after the incident. Taken by Huy Tran, sourced from this ABC report: [https://www.youtube.com/watch?v=axELEWCihJs&ab\\_channel=ABCNews](https://www.youtube.com/watch?v=axELEWCihJs&ab_channel=ABCNews)

[133] Tweet about the finding of cell phones:

<https://twitter.com/SeanSafyre/status/1744138937239822685>

[134] Explanations on the door fittings is detailed in the preliminary report. Here it is again for ease of reference, especially with the following references:

<https://www.nts.gov/investigations/Documents/DCA24MA063%20Preliminary%20report.pdf>

[135] Departure of the door from the aircraft - Preliminary Report pg11

[136] Upper Guide Track Borehole Analysis - Preliminary Report pg12-13

[137] Lower Hinge Assembly Analysis - Preliminary Report pg14

[138] Preliminary report pg14

[139] MED Plug only really being opened for inspection and maintenance -Preliminary Report pg6

[140] Boeing Parts manufactured in different places: <http://www.b737.org.uk/production.htm>

[141] Spirit AeroSystems: <https://www.spiritaero.com/>

[142] Timeline of accident aircraft manufacturing - Preliminary Report pg6

[143] Manufacturing defect warranting the opening of the plug - Preliminary Report pg15

[144] N704AL's first flight:

<https://web.archive.org/web/20240106095131/https://www.planespotters.net/airframe/boeing-737-max-9-n704al-alaska-airlines/380062>

[145] Initial Response from Alaska Airlines:

<https://news.alaskaair.com/alaska-airlines/operations/as-1282/>

[146] FAA ordered US carriers to not operate some of the Max 9s:

<https://www.nytimes.com/2024/01/05/business/alaska-airlines-flight-portland-landing.html>

[147] FAA Ordered inspection of Max 9 MED Plugs:

<https://www.reuters.com/business/aerospace-defense/us-safety-board-investigating-alaska-airlines-boeing-737-max-9-emergency-landing-2024-01-06/>

[148] United Airlines grounding:

<https://www.flightglobal.com/safety/united-airlines-cancels-270-flights-due-to-boeing-737-max-9-grounding/156383.article>

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<https://www.flightglobal.com/airframers/faa-focuses-737-max-9-investigation-on-non-compliance-by-boeing/156458.article>

[151] Latest update from the FAA:

<https://www.faa.gov/newsroom/updates-boeing-737-9-max-aircraft>

[152] NTSB Criticizing Boeing for their lack of co-operation:

[https://www.seattletimes.com/business/boeing-aerospace/ntsb-boeing-not-cooperating-on-investigation-into-alaska-midair-blowout/?utm\\_source=twitter&utm\\_medium=social&utm\\_campaign=article\\_inset\\_1.1](https://www.seattletimes.com/business/boeing-aerospace/ntsb-boeing-not-cooperating-on-investigation-into-alaska-midair-blowout/?utm_source=twitter&utm_medium=social&utm_campaign=article_inset_1.1)

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[154] Houston Overrun:

[https://www.wingsmagazine.com/united-houston-overrun/#:~:text=HOUSTON%20\(AP\)%20%E2%80%94%20Passengers%20had,Airlines%20said%20in%20a%20statement.](https://www.wingsmagazine.com/united-houston-overrun/#:~:text=HOUSTON%20(AP)%20%E2%80%94%20Passengers%20had,Airlines%20said%20in%20a%20statement.)

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-Conclusion-

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[163] A Deep Dive Video on YouTube:

[https://www.youtube.com/watch?v=GyN67qAqfww&ab\\_channel=MorePerfectUnion](https://www.youtube.com/watch?v=GyN67qAqfww&ab_channel=MorePerfectUnion)