

## Research Articles

# Boeing's Turbulent Recent History: Ethical Considerations

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This paper analyzes U.S. aircraft maker Boeing and its recent troubles which include two accidents involving its 737 MAX airplanes resulting in the deaths of 346 passengers and crew. Boeing has been accused of rushing the 737 MAX onto the market prematurely to keep pace with rival Airbus. In its haste to match the commercial moves of its competitor, Boeing may have neglected quality control issues and failed to properly train its pilots for the new design. Boeing's troubles continued into 2024 with an incident involving an Alaska Airlines 737 MAX 9 aircraft that was forced to make an emergency landing after a mid-flight malfunction. All of this raises the question of whether Boeing's recent problems are simply a series of unfortunate accidents or the result of ethical failings on the part of senior executives who have prioritized profits over safety. This paper considers this question as well as what Boeing can do to salvage its reputation and regain trust.

### INTRODUCTION

Founded in 1916, Boeing is the world's oldest aircraft manufacturer. In addition to building commercial aircraft, Boeing designs and builds military aircraft. Launched in 2011, the 737 MAX commercial airplane became Boeing's fastest selling aircraft in history. Although there had been some previous incidents in prior decades involving Boeing aircraft, nothing compared to the twin accidents involving 737 MAX aircraft in 2018 and 2019.

The first accident occurred on a Lion Air flight which crashed into the Java Sea in Indonesia on October 29, 2018, causing 189 deaths of passengers and crew. Following the crash, Boeing claimed that its new aircraft was "as safe as any that has ever flown the skies." Yet a few months later, another fatal accident occurred. This time, it was an Ethiopia Airlines' 737 MAX that crashed after takeoff in Addis Ababa, Ethiopia, killing 157 people. The apparent cause of both accidents was mechanical failures. In particular, the available evidence suggests that Boeing deployed a flawed flight control software system (MCAS) and failed to communicate with pilots and the Federal Aviation Administration (FAA).

### SYSTEM ERROR

In December 2010, Boeing's main competitor, Airbus, introduced the A320neo, an updated version of its popular A320 aircraft with a more fuel-efficient engine. In response, Boeing decided to modify its previously reliable 737NG design to match the A320neo. It launched the new 737 MAX aircraft in August 2011. One thing differentiating this new design was a powerful automated system called the Maneuvering Characteristics Augmentation System (MCAS). It was introduced for the 737 MAX to become more fuel-effi-

cient, and as a result, the larger engines had to be repositioned on the plane wings, which made it more dangerous and allowed for an irregular nose-up stall. MCAS would fix such instant malfunctions through AOA sensors (Angle of Attack), however they relied on pilots as the ultimate safety net who were unaware of the exact procedure to act on in emergency situations, such as to the night before the Indonesia 737 MAX crash. In this crash, the pilots first witnessed the flaw in the MCAS system and were unable to prevent the sensor failures from pushing the nose down since essential training was not provided, and manuals were not updated either (Leggett, 2023). According to one observer: "the system was designed to assist pilots familiar with previous generations of the 737 and prevent them from needing costly extra training in order to fly the new model" (Leggett, 2023). Aviation safety expert Elmar Giemulla, meanwhile, said the 737 MAX plane cannot fly on its own, so the MCAS and sensors were added to compensate for the built-in system error.

### UNETHICAL CORPORATE CULTURE

Whether intentional or not, Boeing violated ethical principles by failing to provide critical information to pilots that could have averted disaster. In 2021, Boeing's shareholders filed a lawsuit against the board of directors. The lawsuit alleged that the board "failed in their fiduciary responsibility to monitor safety and protect the company, its shareholders and its customers from unsafe business practices and admitted illegal conduct" (Baranov, 2022). Although 2018 was a successful fiscal year for Boeing with reported profits exceeding \$10 billion, 2019 was a disaster, with steep losses after the crashes and payouts to victims and their families.

Boeing's corporate culture has been damaged by these scandals. The fatal crashes in Indonesia and Ethiopia suggest that Boeing may have prioritized short-term financial gains over passenger safety. A whistleblower at Boeing's 737 plant in Renton, Washington reportedly raised concerns about unsafe production systems to his superiors, yet those executives ignored his efforts (Gates & Kamb, 2019). Furthermore, in transitioning from the NG to MAX airplanes, Boeing stressed that there would be no simulator training and "management allegedly rejected any design changes that would prolong certification or require additional pilot training" (Herkert et al., 2020).

### **CANCELLATIONS AND COMPENSATION**

In the aftermath of the 737 MAX accidents, Airline Garuda Indonesia canceled a \$4.9 billion order for 49 737 Max jets originally placed in 2014. Other airlines followed suit, choosing instead to buy aircraft from rival Airbus. China and Europe were the first to ground their 737 MAX planes after the crashes and days later the Trump administration finally decided to catch up and put operations in the US on hold until FAA certifications allowed them back in business starting late 2020. The groundings are believed to have cost Boeing an estimated \$20 billion. Boeing's customers and partners, meanwhile, began demanding compensation. Legal issues were discussed in lawsuit cases and public court, but Boeing managed to be proven not guilty, avoided trial with a \$2.5 billion settlement with the U.S. Justice Department in January 2021, and avoided prosecution and being held accountable. With this settlement they accepted liability involving a \$243.6 million fine, airline compensation totaling \$1.77 billion, and \$500 million to the victims' families.

### **DECLARED GUILTY WITH EXTENDED PROBATION**

Boeing had not previously rightfully admitted to any wrongdoings of the 737 MAX-8 2018 and 2019 tragedies until July 2024 for what seemed to some like a small sense of closure. In fact, in 2021, the Department of Justice and Boeing reached a deal where if Boeing stayed out of trouble for the next 3 years as a type of probation, they wouldn't have to face charges. Families that suffered losses from these crashes did not accept this agreement as it seemed too easy to let go; they wanted Boeing to pay a higher price of punishment. Boeing's 3-year probation was due to end on January 7<sup>th</sup>, 2024. What had become the long-awaited finish line, instead took a wrong turn that completely changed their fate and cost them a myriad of problems to follow. On January 5<sup>th</sup>, 2024, an airplane's door panel blew out midair during an Alaska Airlines flight. Though, this time, it was based on a 737 MAX-9 (same model as before, different version), it was actually a result of a manufacturing issue, rather than an engineering flaw, so groundings initiated immediately after the incident. Boeing subsequently pleaded guilty to criminal fraud for misleading the FAA to not require additional training involving the MCAS insert since it cost them time and money. Under the felony plea,

the Department of Justice is now asking for a new 3-year probation, however this time under external monitoring. Additionally, the plea deal means avoiding a public trial, facing a \$243.6 million fine, and investing \$455 million at a minimum in compliance and safety programs (Josephs, 2024).

### **ALASKA AIRLINES FLIGHT 1282**

Less than a week into 2024, questions about Boeing's quality control systems again emerged when a door plug below out mid-flight on an Alaska Airlines flight. This resulted in an emergency landing shortly after takeoff. No serious injuries were reported. Following an investigation, the National Transportation Safety Board reported that the Alaska airplane left the factory without 4 bolts securing the door. This occurred because while Boeing was hurrying production sequences and receiving unfinished business from their supplier Spirit AeroSystems in Kansas, there was no documentation to note the door was removed for reinstallation. As it continued production and inspections, no quality manager could have picked up on the missing bolts if they only looked over their progress on paper rather than physically since the preceding steps were not recorded to begin with (Tangel & Terlep, 2024). As a result, 3-week groundings occurred worldwide of the 737 MAX-9s until FAA approved them to get back in service, who also requested a 90-day action plan to correct quality control problems and regain trust in their supply chain. In terms of costs, Boeing paid Alaska Airlines \$160 million to make up for their losses from the incident. As the carrier operating the largest number of 737 MAX-9s worldwide, United Airlines was the most impacted by the groundings as it cost them \$200 million in net losses for its first quarter of the year due to thousands of flight cancellations.

### **787 DREAMLINER CONCERNS**

Several Boeing incidents dominated headlines in 2024 but a bigger one to note involved FAA investigations on the 787-9 Dreamliner: a wide-body, twin-aisle aircraft widely recognized for its fuel efficiency, sustainable composition and commonly used for international flights. Since its first passenger flight in 2011, no fatalities had been reported. Yet questions about its safety were raised by whistleblower John Barnett who said, "As a quality manager at Boeing, you're the last line of defense before a defect makes it out to the flying public. And I haven't seen a plane out of [the 787-manufacturing plant in] Charleston yet that I'd put my name on saying it's safe and airworthy" (Ember, 2024). Mr. Barnett, who had filed complaints with the U.S. Labor Department in 2017 for the South Carolina plant, was found dead March 2024 from a "self-inflicted gunshot wound" before completing his testimony. Now, 787 deliveries have again paused due to concerns about misconduct of falsified inspection records and as risks of premature failure after assembling them were voiced. Boeing quality engineer and recent whistleblower Sam Salehpour claimed that the Boeing 787 Dreamliner was flawed because the fuselage, otherwise known as the aircraft's body, was not prop-

erly fastened, which can be catastrophic after thousands of trips and possibly tear the plane open in the air. Unfortunately, the whistleblower was simply “silenced and transferred to work on another wide-body aircraft” (Walker & Glanz, 2024). Boeing denied these allegations.

### STARLINER CONFLICT

To make matters worse, Boeing's space division is also experiencing concerns. Two astronauts were sent up to the International Space Station by the Boeing Starliner spacecraft on June 6<sup>th</sup>, 2024. However, due to a malfunction, what was initially planned to be an 8-day space trip, may now last until 2025. In fact, this flight first begun tests to be operated in 2019 but has been delayed for years due to NASA investigations on certain failures that occurred during test flights continuously. As a result, Elon Musk's SpaceX has been deemed more favorable in the industry since 2020, which is no surprise given the Starliner's first mission did not meet expectations.

### REBUILDING TRUST

As it looks to rebuild trust, Boeing must fully prioritize quality assurance and safety. This will involve changing the company's culture – a difficult task that can take years to accomplish. According to quality guru W. Edwards Deming, the key to good quality is practicing continual improvement and the key to successful management is long-term commitment. Boeing seemed to lack these things as they prioritized quick results without innovative goals and minimum efforts to keep operations at their highest consideration. In May 2024, Boeing proposed a new quality control plan to the FAA which marked new beginnings in route for safer machinery in its aircraft. The company indicated that it will use 6 critical safety-focused production performance indi-

cators: (i) employee proficiency, (ii) rework hours for defects, (iii) supplier shortages, (iv) total rework hours per plane, (v) travelers at factory rollout to indicate when parts of the plane may be moved after assessments are completed, and lastly, (vi) ticketing performance for mishaps (Boeing, 2024).

Effectiveness will also be measured through culture surveys and constant FAA monitoring among weekly and monthly progress reviews and addressing audit findings (*Updates on Boeing 737-9 MAX Aircraft*, 2024). According to Boeing senior vice president of quality, Elizabeth Lund, additional significant changes include enhancing training and moving managers more frequently on the factory floor to mentor; eliminating defects during assembling by increasing inspections and pausing production lines for days if necessary; and strengthening their Safety Management System which includes employee safety reporting. Initiatives to elevate the influence of human factors and pilot input will also take place. The steps they're taking align with Mann's suggestion. As a result since the implementation, Lund says, “we have seen up to an 80% reduction in defects” and 2<sup>nd</sup> generation Boeing employee David Prigg confirms he has noticed the shift since employees have become “more assertive about speaking up about safety concerns. They're even more open to offering suggestions to help make their workflow more efficient” (USA Today, 2024).

Although rebuilding trust is never easy, Boeing's recent emphasis on quality, safety, transparency, and communication with the FAA appear to be steps in the right direction.

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