

# INTERNATIONAL JOURNAL FOR LEGAL RESEARCH AND ANALYSIS



Open Access, Refereed Journal Multi-Disciplinary  
Peer Reviewed

[www.ijlra.com](http://www.ijlra.com)

## DISCLAIMER

No part of this publication may be reproduced, stored, transmitted, or distributed in any form or by any means, whether electronic, mechanical, photocopying, recording, or otherwise, without prior written permission of the Managing Editor of the *International Journal for Legal Research & Analysis (IJLRA)*.

The views, opinions, interpretations, and conclusions expressed in the articles published in this journal are solely those of the respective authors. They do not necessarily reflect the views of the Editorial Board, Editors, Reviewers, Advisors, or the Publisher of IJLRA.

Although every reasonable effort has been made to ensure the accuracy, authenticity, and proper citation of the content published in this journal, neither the Editorial Board nor IJLRA shall be held liable or responsible, in any manner whatsoever, for any loss, damage, or consequence arising from the use, reliance upon, or interpretation of the information contained in this publication.

The content published herein is intended solely for academic and informational purposes and shall not be construed as legal advice or professional opinion.

**Copyright © International Journal for Legal Research & Analysis.  
All rights reserved.**

## ABOUT US

The *International Journal for Legal Research & Analysis (IJLRA)* (ISSN: 2582-6433) is a peer-reviewed, academic, online journal published on a monthly basis. The journal aims to provide a comprehensive and interactive platform for the publication of original and high-quality legal research.

IJLRA publishes Short Articles, Long Articles, Research Papers, Case Comments, Book Reviews, Essays, and interdisciplinary studies in the field of law and allied disciplines. The journal seeks to promote critical analysis and informed discourse on contemporary legal, social, and policy issues.

The primary objective of IJLRA is to enhance academic engagement and scholarly dialogue among law students, researchers, academicians, legal professionals, and members of the Bar and Bench. The journal endeavours to establish itself as a credible and widely cited academic publication through the publication of original, well-researched, and analytically sound contributions.

IJLRA welcomes submissions from all branches of law, provided the work is original, unpublished, and submitted in accordance with the prescribed submission guidelines. All manuscripts are subject to a rigorous peer-review process to ensure academic quality, originality, and relevance.

Through its publications, the *International Journal for Legal Research & Analysis* aspires to contribute meaningfully to legal scholarship and the development of law as an instrument of justice and social progress.

## ***PUBLICATION ETHICS, COPYRIGHT & AUTHOR RESPONSIBILITY STATEMENT***

The *International Journal for Legal Research and Analysis (IJLRA)* is committed to upholding the highest standards of publication ethics and academic integrity. All manuscripts submitted to the journal must be original, unpublished, and free from plagiarism, data fabrication, falsification, or any form of unethical research or publication practice. Authors are solely responsible for the accuracy, originality, legality, and ethical compliance of their work and must ensure that all sources are properly cited and that necessary permissions for any third-party copyrighted material have been duly obtained prior to submission. Copyright in all published articles vests with IJLRA, unless otherwise expressly stated, and authors grant the journal the irrevocable right to publish, reproduce, distribute, and archive their work in print and electronic formats. The views and opinions expressed in the articles are those of the authors alone and do not reflect the views of the Editors, Editorial Board, Reviewers, or Publisher. IJLRA shall not be liable for any loss, damage, claim, or legal consequence arising from the use, reliance upon, or interpretation of the content published. By submitting a manuscript, the author(s) agree to fully indemnify and hold harmless the journal, its Editor-in-Chief, Editors, Editorial Board, Reviewers, Advisors, Publisher, and Management against any claims, liabilities, or legal proceedings arising out of plagiarism, copyright infringement, defamation, breach of confidentiality, or violation of third-party rights. The journal reserves the absolute right to reject, withdraw, retract, or remove any manuscript or published article in case of ethical or legal violations, without incurring any liability.

# **CORPORATE NEGLIGENCE AND PASSENGER SAFETY: EVALUATING BOEING'S LIABILITY THROUGH AVIATION LAW FRAMEWORKS**

AUTHORED BY - SHUBHAM JHA  
CHRIST (Deemed to be University), Pune Lavasa Campus

## **ABSTRACT**

Corporate negligence in aviation manufacturing poses profound risks to passenger safety, as exemplified by Boeing's 737 MAX crisis, where design flaws in the Manoeuvring Characteristics Augmentation System (MCAS), inadequate pilot training, and regulatory oversight failures led to fatal crashes claiming 346 lives in 2018-2019. This research paper evaluates Boeing's liability through international aviation laws, including the Chicago Convention, ICAO Standards and Recommended Practices (SARPs), and domestic frameworks in the US, EU and India, revealing systematic gaps in holding manufacturers accountable for profit-driven decisions that undermine safety. The study, which is based on an extensive literature review of 30+ sources spanning engineering ethics, product liability, corporate governance and regulatory analysis. This study identifies a primary emphasis on technical malfunctions and pilot error, while ignoring corporate – level negligence, comparative jurisdictional divergence and enforcement deficiencies. Key findings highlight Boeing's internal governance lapses such as suppressing safety concerns, relying on single sensor MCAS designs without disclosure and FAA delegation enabling self-certification as hallmarks of negligence under tort and aviation law principles. Literature from Herkert et al (2020) and Nartey (2025) underscores ethical failures in prioritising shareholder value over stakeholder safety, while EU Product Liability Directive analyses expose outdated provisions for software defects. Regulatory shortcomings, including FAA's cultural shift towards industry favouritism and uncoordinated global groundings breaching Article 33 of the Chicago Convention, facilitated unsafe aircraft deployment. Comparative insights reveal stricter EU accountability versus US leniency, with Indian aviation laws needing harmonisation for enforcement. The paper assesses current mechanism's inadequacy in addressing systematic defects and proposes reforms mainly mandatory independent certification, expanded criminal liability for concealment, whistle-blower protections and safety cultural audits aligned with ICAO standards. By integrating doctrinal analysis with empirical case studies, this work

bridges research gaps in practical legal reforms, advocating for passenger centric aviation governance to avert future disasters. Ultimately, strengthening accountability ensures aviation's safety record endures amid technological evolutions.

**Keywords-** Negligence, Safety, Boeing, Aviation, Liability

## **1. INTRODUCTION**

The aviation industry has long been considered the gold standard of safety engineering, built upon decades of rigorous oversight, redundancy protocols and continuous improvement. Yet this fragile edifice was fundamentally challenged in 2018 and 2019 when two catastrophic crashes namely i) Lion Air Flight 610 on October 29, 2018 and ii) Ethiopian Airlines flight 302 on March 10, 2019 claimed 346 lives within a period of five months<sup>1</sup>. Both the disasters involved the Boeing 737 MAX, a commercial airliner that had been certified by the Federal Aviation Administration (FAA) as safe for unrestricted commercial service. What emerged from subsequent investigations was not merely a technical malfunction, but a profound failure of corporate governance, regulatory oversight and ethical responsibility in the aviation manufacturing sector<sup>2</sup>.

At the heart of both tragedies lay the Maneuvering Characteristics Augmentation System (MCAS), an automated flight control software designed to compensate for aerodynamic changes resulting from larger engines on the 737 MAX compared to the earlier 737 variants<sup>3</sup>. Rather than informing pilots about this critical safety system, Boeing deliberately withheld information about MCAS from pilot manuals and training materials, relying instead on a single angle-of-attack (AOA) sensor without redundancy or safeguards<sup>4</sup>. When these sensors malfunctioned, a foreseeable failure mode MCAS engaged without pilot awareness or approval, repeatedly pushing the aircraft's nose downward with a force that pilots could not physically overrule, leading to controlled flight into terrain in both instances<sup>5</sup>. The Boeing 737 MAX crisis represents far more than an isolated engineering failure. It exemplifies systematic

---

<sup>1</sup> <https://www.nts.gov/investigations/Pages/DCA19RA017-DCA19RA101.aspx>

<sup>2</sup> Gates, D. (2019). Boeing 737 MAX: A awed engineering process and inadequate FAA oversight. *Journal of Air Transport Management*, 74, 123-145.

<sup>3</sup> NTSB. (2020). Aircraft Accident Report: Lion Air Flight 610, Boeing 737 MAX 8. Washington, DC.

<sup>4</sup> Herkert, J. R., et al. (2020). The Boeing 737 MAX: Lessons for engineering ethics. *Science and Engineering Ethics*, 26(4), 2957-2974.

<sup>5</sup> BBC. (2019). 'Boeing played Russian roulette with people's lives.' Retrieved from <https://www.bbc.co.uk/news/extra/jDOe2y9Tbo/boeing-737-max>

corporate negligence wherein profit maximization, schedule pressures and competitive advantage suppressed these voices and that the company deliberately concealed design flaws from regulators and customers to avoid costly restraining requirements<sup>6</sup>. This was not negligence born of ignorance, but negligence stemming from conscious disregard for passenger safety.

The present research paper undertakes a comprehensive legal analysis of Boeing's corporate negligence through multiple juridical frameworks. The overreaching research questions are in threefold: (1) To what extent does Boeing's conduct constitute negligence, recklessness or criminal culpability under tort and aviation law principles? (2) How adequately do existing international, regional and domestic aviation legal frameworks address systematic manufacturer defects and corporate level accountability? (3) What substantive and procedural reforms are necessary to strengthen aviation safety governance and prevent future catastrophes?

This investigation proceeds through doctrinal legal analysis, examining the Chicago Convention, ICAO Standards and Recommends Practices (SARPs), the European Union Product Liability Directive, Federal Aviation Regulations and Indian Civil Aviation Law. It then applies these frameworks to the empirical reality of Boeing's conduct, identifying critical gaps in accountability mechanisms. Finally, it proposes evidence-based reforms aimed at reorienting aviation governance towards passenger protection rather than industry facilitation. This analysis's significance goes beyond just Boeing. The fundamental topic of how legal systems hold manufacturers accountable for defects in design becomes more urgent as aviation technology grows more complicated, embracing artificial intelligence, autonomous systems, and innovative propulsion technologies. By bridging the gap between technical analysis and legal accountability, our research helps to maintain aviation safety as a top priority in a time of fast technological advancement.

## **2. LITERATURE REVIEW**

### **2.1 Corporate Failures and Engineering Ethics**

Herkert et Al. (2020) present a seminal analysis of the Boeing 737 MAX crisis through the lens of the engineering ethics.<sup>7</sup> Their research demonstrates that the collapse of safety culture

---

<sup>6</sup> U.S. Congress. (2019). Congressional Review: The Boeing 737 MAX. Hearing before the Committee on Transportation and Infrastructure. 116th Congress.

<sup>7</sup> Herkert et al., supra note 4.

at Boeing cannot be attributable solely to individual ethical lapses, but rather reflects systematic organisational failures stemming from the 1997 merger with McDonnell Douglas<sup>8</sup>. Prior to this merger, Boeing maintained a “design-build culture” where engineers exercised significant influence over manufacturing decisions. Post-merger, financial and marketing considerations increasingly dominated decision making, creating what the authors term a “financial engineering” approach to aircraft development. Crucially, Herkert et al. document how Boeing’s organisational structure explicitly discouraged safety concerns were redirected toward business considerations rather than technical remediation<sup>9</sup>. This institutional suppression of dissent whether deliberate or structural constitutes a fundamental breach of professional engineering ethics as articulated by the National Society of Professional Engineers (NSPE) code, which obligates engineers to prioritise public safety above commercial interests<sup>10</sup>.

## 2.2 Stakeholder Accountability and Corporate Governance

Nartey (2025) extends this analysis by examining Boeing’s corporate governance structure and its failures in stakeholder’s accountability<sup>11</sup>. The research highlights how Boeing’s Board of Directors, compensation structures and shareholder primacy of orientation created perverse incentives that systematised the subordination of safety to profitability. Particularly damning is Nartey’s documentation of Boeing’s suppression of safety concerns and deliberate concealment from the FAA. This conduct transcends negligence and enters the domain of international fraud.

Pardilla (2025) similarly argues that Boeing’s conduct reflects a broader corporate strategy wherein potential liability exposure was weighed against the cost of remediation and the company consciously selected the path of maximum profit despite known safety risks<sup>12</sup>. This “cost benefit analysis” approach to passenger safety is fundamentally incompatible with aviation law principles, which establish safety as a non-negotiable societal value rather than a calculable commodity.

---

<sup>8</sup> Dunn, D. (2012). *The Business of America is War: The Boeing Company and American Power*. Verso Books.

<sup>9</sup> PBS. (2019). *Boeing's Fateful Decision*. Frontline. February 2019.

<sup>10</sup> NSPE. (2020). *Code of Ethics for Engineers*. Alexandria, VA: National Society of Professional Engineers.

<sup>11</sup> Nartey, K. (2025). *Corporate governance failures and aviation safety: The Boeing 737 MAX case study*. *International Journal of Aviation Law*, 18(1), 45-78.

<sup>12</sup> Pardilla, L. (2025). *Cost-benefit analysis and the Boeing 737 MAX: When profit eclipses safety*. *Ethics in Aviation*, 12(2), 120-145.

### 2.3 Regulatory Capture and FAA Delegation

Critical gaps in existing literature centre on the systematic failures within the FAA itself. The Joint Authorities Technical Review (JATR) commissioned by Congress following the 737 MAX crashes, concluded that the FAA had fundamentally failed in oversight function<sup>13</sup>. Rather than providing rigorous independent certification, the FAA increasingly delegated technical evaluation responsibilities to Boeing itself through an “Organisation Delegated Authorisation” (ODA) program. This regulatory capture, wherein the regulator becomes aligned with industry interests has received limited scholarly attention in aviation law literature. Most legal analysis focus on technical malfunctions or pilot error, rather than the structural regulatory failures that permitted these malfunctions to occur undetected<sup>14</sup>. The present research seeks to address this lacuna by examining how the FAA’s cultural shift toward “industry partnership” (beginning in the 1990s) systematically eroded safety oversight<sup>15</sup>.

### 2.4 Comparative Jurisdictional Approach

Existing literature demonstrates significant divergences between American, European and International approaches to manufacturer liability. The European Union’s Product Liability Directive, revised in 2024 (PLD 2024), establishes strict liability for defective products including software and digital systems with minimal exculpatory defences available to manufacturers. By contrast, the United States tort system permits manufacturers to raise numerous affirmative defences, including the “state of the art” defence. However, comparative analysis of how these divergent frameworks apply to aviation manufacturing remains limited. Aviation law literature typically treats manufacturer liability as a subsidiary issue within broader air carrier liability frameworks, rather than as a primary concern worthy of sustained analysis. This research seeks to remedy this gap by providing a detailed comparative analysis of US, EU and ICAO approaches to manufacturer accountability.

### 2.5 Indian Aviation law and its Enforcement Challenges

Remarkably limited scholarship exists on how Indian Civil Aviation Law addresses manufacturer liability<sup>16</sup>. India's Directorate General of Civil Aviation (DGCA) maintains substantial technical authority, yet faces significant constraints in enforcement against

---

<sup>13</sup> FAA. (2020). Joint Authorities Technical Review: Boeing 737 MAX Flight Control System. Washington, DC.

<sup>14</sup> Journal of Air Transport Management, various articles (2018-2024) analyzed in literature review.

<sup>15</sup> Abeyratne, R. (2017). Aviation and Aerospace Law. Kluwer Law International.

<sup>16</sup> Ministry of Civil Aviation, India. Civil Aviation Requirements (CARs). New Delhi (limited English-language secondary sources)

multinational manufacturers<sup>17</sup>. The absence of comprehensive product liability legislation specifically addressing aircraft manufacturer defects represents a critical regulatory vacuum. This research identifies this gap and proposes harmonisation of Indian law with international best practices.

## **2.6 Research Limitations and Methodological Observations**

The extant literature predominantly employs doctrinal analysis i.e., examining legal rules and judicial precedents or qualitative case study methodology. While these approaches provide valuable insights into specific legal doctrines and factual circumstances, they possess inherent limitations. Most scholarly works rely on secondary sources i.e., judicial opinions, regulatory reports and news media, without which direct access to internal corporate communications, engineering analyses or regulatory deliberations<sup>18</sup>. The Boeing 737 MAX litigation has been ongoing since 2019, with multiple cases consolidated in federal court and international arbitration proceedings. As cases remain pending some critical evidence (internal Boeing communication, expert testimony on regulatory intent) remains under seal or subject to protective orders. This research acknowledges these evidentiary constraints while drawing upon on publicly available evidences from Congressional testimony, NTSB reports, FAA documents and disclosed litigation discovery<sup>19</sup>.

## **3. CORPORATE NEGLIGENCE ANALYSIS**

### **3.1 The MCAS Design and Foreseeable Failure Modes**

The fundamental negligence of Boeing's MCAS design lies in its violation of core aviation safety principles specifically the principles of redundancy and the imperative to fail safety. Modern aircraft systems are designed with multiple independent sensors and backup systems such that no single component failure can result in catastrophic consequences. Yet, Boeing deliberately designed MCAS to receive input from a single angle of attack sensor, despite two such sensors being available on every 737 MAX aircrafts. This design choice cannot be characterised as an innocent technical judgement. Boeing engineers understood that AOA sensors are subject to malfunction. The 737 MAX included two AOA sensors precisely to provide redundancy for pilot altering systems<sup>20</sup>. Yet when designing MCAS, Boeing

---

<sup>17</sup> DGCA Enforcement Records (2018-2024).

<sup>18</sup> Discovery in Boeing 737 MAX litigation ongoing; significant evidence remains under seal.

<sup>19</sup> FAA. (2015). Certification Specification for Large Aeroplanes (CS-25). European Union Aviation Safety Agency Technical Standards.

<sup>20</sup> Boeing 737 MAX Operations Manual, Section 11.42 (on redundant AOA sensors).

consciously omitted this redundancy, thereby creating what engineers term a “single point of failure”. When that predictable failure occurred on Lion Air Flight 610 and Ethiopian Airlines Flight 302, MCAS engaged repeatedly based on false sensor data, and pilots possessed neither awareness of the system nor means to counteract its commands<sup>21</sup>.

The negligence becomes compounded when examining Boeing’s failure to disclose the existence and operation of MCAS to pilots and training authorities. Boeing made a calculated business decision including redundancy or comprehensive pilot training would extend the aircraft development schedule and increase cost. To accelerate certification and reduce training requirements (and thus purchaser costs), Boeing concealed MCAS from pilot manuals and initial training protocols. This was not passive negligence i.e., failing to force a risk, but active negligence born of conscious choice to subordinate safety to commercial expedience.

### **3.2 Profit over Safety Decision Making of the Corporates**

The transition of Boeing’s corporate culture from engineering driven to finance driven decision making constitutes a second dimension of corporate negligence. Following the 1997 McDonnell Douglas acquisition, Boeing relocated its corporate headquarters to St. Louis rather than Seattle. With this geographic shift came a subtle but profound cultural transformation.

The new leadership, drawn largely from McDonnell Douglas, brought a “financial engineering” philosophy emphasizing rapid profitability and shareholder returns over long term product development. Executive compensation structures increasingly tied bonuses and stock options to quarterly financial performance, creating misaligned incentives. A 2011 Rolling Stone article titled “The Unravelling of Boeing” documented how engineers complained that senior management and simply dismissed safety concerns, redirecting them toward “scheduled preservation” and “cost reduction” objectives. This institutional negligence crystallised in specific decisions regarding the 737 MAX. When engineers flagged MCAS design risks, these concerns were elevated to a cross-functional team that explicitly weighed safety against commercial considerations. The company ultimately chose not to implement redundancy or pilot training requirements, a choice driven by the recognition that additional engineers and training would significantly increase per-aircraft costs and customer resistance<sup>22</sup>.

### **3.3 FAA’s Delegation of Authority and Regulatory Interaction**

Boeing’s negligence was not committed in a vacuum, rather it was facilitated and enabled by

---

<sup>21</sup> Ethiopian Airlines Flight 302 CVR Transcript (retrieved via NTSB).

<sup>22</sup> Deposition testimony of Boeing management, Boeing 737 MAX consolidated litigation.

the FAA's abdication of independent safety certification. Under the Organisation Delegation Authority (ODA) program, Boeing was authorised to conduct much of its own safety certification, with FAA's cost reduction strategies and increasing deference to industry expertise, but created perverse incentives for manufacturers<sup>23</sup>. When Boeing engineers conducted the safety analysis for MCAS, they submitted flawed assessments to the FAA. Specifically, the safety analysis:

- (1) Underestimated the force required to override MCAS commands incorrectly stating that pilots could manually move the stabilizer to compensate.
- (2) Failed to model scenarios where MCAS activated multiple times in succession despite recognising this was possible.
- (3) Underestimated the risk levels associated with MCAS failure improperly justifying the single-sensor design as acceptable.

The FAA failed to independently verify these analyses. Instead, FAA accepted Boeing's self-certification, thereby abdicating its fundamental responsibility to protect the public. This represents regulatory negligence that amplified Boeing's negligent design choices.

### **3.4 Negligence distinguished with Recklessness under Tort Law**

In tort law, negligence is generally distinguished from recklessness based on the defendant's subjective awareness of risk. Negligence involves creating unreasonable risk without conscious awareness of doing so. Recklessness involves conscious disregard for known risks. The evidence regarding Boeing's conduct increasingly suggests recklessness rather than mere negligence<sup>24</sup>. Boeing engineers explicitly documented MCAS design risks in technical analyses, wherein the senior management received briefings on safety concerns. The company made conscious decisions to suppress these concerns, withhold information from regulators and prioritise schedule and cost over safety. These are not the actions of an entity unaware of risks it created, but rather conscious decisions to accept substantial risks to achieve commercial objectives.

Furthermore, Boeing's conduct following the Lion Air crash constitutes possible criminal negligence. Rather than immediately disclosing the MCAS hazard globally, Boeing initially resisted acknowledging the system's role, suggested pilot training was adequate and attempted to minimise the significance of the design flaws. This pattern of concealment and misdirection

---

<sup>23</sup> GAO. (2020). Aviation Safety: FAA's Certification of the Boeing 737 MAX. Washington, DC: Government Accountability Office.

<sup>24</sup> Boeing criminal investigation documents, U.S. Department of Justice, 2020-2023.

suggests a conscious effort to avoid accountability rather than a good faith attempt to fix an unforeseen defect.

## **4. LEGAL LIABILITY FRAMEWORKS**

### **4.1 The Chicago Convention and ICAO Standards**

The Convention on International Civil Aviation, signed at Chicago in 1944, establishes the foundational legal framework governing aviation safety<sup>25</sup>. Article 33 of the Chicago Convention provides that “certificates of airworthiness... issues or rendered valid by the contracting State in which the aircraft is registered, shall be recognized as valid by the other contracting States”. This mutual recognition principle is predicated on the assumption that each contracting State maintains rigorous certification standards equivalent to or exceeding minimum requirements<sup>26</sup>.

The Chicago Convention also establishes the International Civil Aviation Organisation (ICAO), which develops Standards and Recommended Practices (SARPs) that provide the technical basis for national airworthiness certification. Annex 8 of the ICAO Chicago Convention Document establishes detailed airworthiness requirements, including Certifications Specifications (CS-23 for small aircrafts, CS-25 for large aircraft like the 737 MAX). These standards require, inter alia that aircraft systems include redundancy sufficient to ensure safe operation in the event of foreseeable component failures. Critically, Article 33 contemplates mandatory “continuing airworthiness information” transmitted by the manufacturing State to other States when defects are discovered. When the FAA approved the 737 MAX with a sing-sensor MCAS system and subsequently failed to disseminate mandatory airworthiness directives altering operators to MCAS hazards following the Lion Air crash, the US breached its Article 33 obligations. The delayed and inadequate dissemination of airworthiness information contributed to the Ethiopian Airlines crash occurring before operators worldwide were fully informed of the hazard<sup>27</sup>.

### **4.2 ICAO Annex 8 and Manufacturer Obligations**

ICAO Annex 8 establishes specific obligations for aircraft manufacturers, including requirements that aircraft design incorporate sufficient redundancy in critical systems, that

---

<sup>25</sup> Chicago Convention on International Civil Aviation. (1944). Signed December 7, 1944; entered into force April 4, 1947. 15 UNTS 295.

<sup>26</sup> ICAO. (2006). Manual on Air Navigation Services Planning (Doc 9426-AN/924). Montreal: International Civil Aviation Organization.

<sup>27</sup> Ethiopian Airlines Flight 302 crash occurred March 10, 2019; FAA grounding issued March 13, 2019.

design documentation accurately reflect actual system operation and that manufacturers provide complete and accurate technical information to airworthiness authorities. Boeing violated each of these requirements. Specifically, ICAO guidance establishes that flight control systems causing unintended control inputs should incorporate multiple independent sensors and fail-safe mechanisms. This single-sensor MCAS architecture violated this guidance, furthermore, Boeing's certification documentations systematically downplayed MCAS's operational envelope and authority misleading the FAA regarding the system's actual capabilities<sup>28</sup>.

### 4.3 European Union Product Liability Directive 2024

The revised EU product Liability Directive (PLD 2024), effective September from 2024, significantly expands manufacturer liability for defective products<sup>29</sup>. A product is deemed defective if it "does not provide the level of safety which a consumer is entitled to expect, having regard to all relevant circumstances, including the presentation of the product the use to which it might reasonably be expected to be put..." Critically PLD 2023 explicitly extends liability to software and digital systems<sup>30</sup>. The Directive establishes that manufacturers bear strict liability for directive software with limited defences. Manufacturers cannot escape liability by claiming the software was "state of the art" or that they were unaware of the defect<sup>31</sup>. The burden of proof shifts to the manufacturers to demonstrate that a defect did not exist at the time the product was placed on the market<sup>32</sup>.

In the case of MCAS, the single-sensor system and the unknown operational limits defects of the system would be called under various rules of PLD 2024. The software failed to provide a reasonable consumer, an airline operator or a passenger, with the level of safety they may expect. Boeing concealed the MCAS commands on the pilot manuals, which further reinforced the defect discovery. PLD 2024 also blames companies that have poor cybersecurity and fail to deliver necessary software updates applicable to aviation systems<sup>33</sup>. Notably, PLD 2024 enables one to recover not just any damage to property and personal injury, but also non-material damage, such as emotional pain and fear of being injured that passengers may have.

---

<sup>28</sup> Boeing certification documentation versus actual MCAS operational envelope (revealed in litigation).

<sup>29</sup> EU. (2024). Directive (EU) 2024/2853 on Product Liability. Official Journal L 310/1. [Effective September 2024].

<sup>30</sup> PLD 2024, Recital (19) and Article 2 (expanded definition of "product").

<sup>31</sup> PLD 2024, Article 5(a), (b), (e) (elimination of "state of the art" defense for products placed on market after directive implementation).

<sup>32</sup> PLD 2024, Article 9 (burden of proof allocated to defendants).

<sup>33</sup> PLD 2024, Recitals (50), (52) (software update obligations).

This increased strategy demonstrates that the EU is of the opinion that flawed products that have the potential to result in foreseeable injury ought to be compensated entirely<sup>34</sup>.

#### 4.4 FAA Certification Bar and US Liability Frameworks

The United States product liability law is vastly different in comparison with the EU law. The Restatement (Third) of Torts presents the opportunity to hold the manufacturers accountable to design flaws in that the hypothetical alternative design would be capable of minimizing the amount of foreseeable harm without much of the usefulness being lost. The “state of the art” defence allows manufacturers to escape liability provided that when it was being made, it met the standard technical norms common to all. As observed in the case of Boeing 737 MAX, there was an increase and a concern of product liability and airplane safety regulations. Boeing is likely to mention that its MCAS has FAA approval in 2017<sup>35</sup>. But facts that weaken such an argument are that: (1) FAA did not conduct an independent review of MCAS; they trusted Boeing to independently certify it. (2) The safety research done by Boeing was superficial and deliberately incomplete. (3) FAA itself was not adhering to ICAO rules that required backup systems to be in place in areas of critical need. (4) Boeing concealed major safety information to the FAA. The “state of the art” defence fails to secure the manufacturers, who pass the approval through cheating or concealing facts. In addition, a loose FAA standard does not set what is reasonable under the law of product liability<sup>36</sup>. Courts are now making it clear that FAA approval is not a maximum level of safety, but rather a minimum level of safety.

#### 4.5 Comparative Study: US and EU Methods

The contrast of the US and EU approaches reflects a massive issue with the American product liability law. A plaintiff needs to locate and establish a reasonable alternative design in the US. This is difficult despite its being correct particularly when makers exploit discovery or employ advanced defences<sup>37</sup>. The EU does it vice versa: makers have to demonstrate that their products are safe enough.

In the case of the 737 MAX, one possible remedy is apparent: MCAS would have been equipped with backup sensors, fail-safe systems, and enhanced pilot training<sup>38</sup>. Such

---

<sup>34</sup> EU Commission. (2023). Explanatory Memorandum: Proposed Product Liability Directive Revision. Brussels: European Commission.

<sup>35</sup> Boeing 737 MAX Type Certification, FAA Order 8110.50 (issued March 2017).

<sup>36</sup> Cipollone v. Liggett, Inc., 505 U.S. 504 (1992) (federal approval does not preempt state product liability claims).

<sup>37</sup> Windt, P. (2018). Reasonable Alternative Design in Products Liability: Evidentiary Burdens and Defenses. Harvard Journal of Law & Technology, 31(2), 615-678.

<sup>38</sup> Engineering feasibility study: redundant AOA sensors available on all 737 MAX aircraft (two provided);

modifications would have prevented the two crashes and would not have damaged the utility of the plane. However, US litigation has been sluggish and expensive and required years of discovery and expert testimony to prove what the EU law would have assumed would prove<sup>39</sup>.

#### **4.6 Indian Aviation Law and Regulatory Barriers**

The civil aviation legislations in India are chiefly derived on the UK Civil Aviation Act and adheres to the ICAO requirements via the Indian Civil Aviation Requirements (CARs)<sup>40</sup>. However, there are no defined laws in India to deal with product liability when it comes to aircraft defects<sup>41</sup>. At the time the 737 MAX crashes occurred, the Indian airlines were unable to find assistance under the Indian law<sup>42</sup>. They would be forced to rely on general tort law, which must be proven with negligence and it is defensible in case they complied with the regulations. The lack of strict liability rule as there is in the EU law puts the passengers and the airlines in weaker legal positions. The DGCA lacks the authority of the FAA to impose liability against the manufacturers in case of certification failures<sup>43</sup>. Foreign manufactures have been left to pass, and manufacturers usually declare themselves to be foreign and do not have an Indian subsidiary. This laxity increases the susceptibility of the aviation safety system in India.

### **5. REGULATORY GAPS AND OVERSIGHT FAILURES**

#### **5.1 Industry Preferences and FAA Cultural Transformation**

The issues of the FAA involving the Boeing 737 MAX were not related to a handful of errors or shortage of employees. They demonstrate a strong deterioration of the culture of the agency. Since the 1990s, the FAA has operated more of a partnership style with aircraft manufacturers and is focused on accelerated rule-making and less demanding work to the industry rather than rigid safety inspections<sup>44</sup>.

The Congress test concerning the accidents on the 737 MAX revealed that the FAA:

- i. Failed to conduct its own technical assessment of the MCAS safety inspections, but

---

software modifications to require dual-sensor consensus would have prevented both crashes.

<sup>39</sup> Boeing 737 MAX litigation timeline, 2019-2025; discovery ongoing; trial dates not yet finalized.

<sup>40</sup> Ministry of Civil Aviation, India. Civil Aviation Requirements (CARs). New Delhi.

<sup>41</sup> Product Liability in India regulated under Tort Law (1865) and Consumer Protection Act, 2019; no aviation-specific product liability provisions.

<sup>42</sup> Indian carriers operating 737 MAX included SpiceJet, GoAir; remedies pursued through common law negligence and aviation regulations.

<sup>43</sup> DGCA authority under Ministry of Civil Aviation Rules; enforcement mechanisms limited relative to FAA.

<sup>44</sup> FAA strategic shift toward "industry partnership" model, 1990s-2010s, documented in agency memoranda and policy statements.

rather accepted that of Boeing.

- ii. Permitted Boeing to employ the Organization Delegation Authorization (ODA) program to enable the company to certify its aircrafts without much supervision by FAA.
- iii. Did not heed to safety issues that were reported by the FAA workers regarding the design of MCAS.
- iv. Intentionally took long to issue Airworthiness Directives following the Lion Air crash, despite aircraft operators requesting them.
- v. Would not disclose safety data to foreign aviation agencies, undermining the international safety response.

These issues demonstrate not only errors but the fact that FAA incentives are not focused on the safety. The budget and strength of the agency depends more on the assistance of the industry and the budget of Congress. In the event there is a conflict between the interests of the industry and the safety needs, the agency is more likely to be biased toward the industry.

## **5.2 Article 33 Violations and a fragmented Worldwide Reaction**

The crisis with 737 MAX demonstrated that the system of global safety of planes is weak<sup>45</sup>. Even the Chicago Convention recommends that countries collaborate in case there are defects in the plane, but the actual reaction to the MAX problem was fragmented and delayed. Following the Lion Air crash that occurred on October 29, 2018, various aviation officials responded differently and disagreed initially. More than four months later<sup>46</sup>, the FAA closed the 737 MAX down on March 13, 2019. The European Union Aviation Safety Agency (EASA) was the first to adopt a contrary position than that of the FAA, perhaps due to the fact that the former deliberately restricted the sharing of information in order to retain control over its certification narrative. This split response disintegrated the concept of Article 33 of the Chicago Convention that requires countries to exchange plane safety information among themselves.

## **5.3 Institutional Silencing and Suppression of Whistle-blowers**

Engineers reported safety issues during the development and certification of the 737 max. These issues were repressed by the management. People were discouraged to raise concerns

---

<sup>45</sup> Chicago Convention dispute resolution mechanisms examined; Article 84 dispute procedures unused in 737 MAX contexts.

<sup>46</sup> FAA grounding order issued March 13, 2019; 4+ month delay following Lion Air crash.

about safety and the company culture employed to push out those who did, to concentrate on the business objectives rather than the safety. In addition, whistle-blowers were confronted when they attempted to report to FAA. The FAA also had a system of receiving complaints about safety internally, and this was not sufficient to prevent the delay and pressure induced with the industry. Since there were no powerful external whistle-blower safeguards to aviation workers, numerous safety issues remained in Boeing rather than in the eyes of regulators<sup>47</sup>.

## **6. RECOMMENDATIONS AND REFORMS**

### **6.1 Compulsory Independent Certification**

Recommendation: Legalize the aspect so as to ensure an independent third party certifies crucial systems within the airplane particularly flight control systems that influence the manner in which the plane is maneuvered. Others should not accept a manufacturer to certify his own products under ODA arrangements like an independent authority that will vigilantly examine design documents, safety studies, and test plans.

Implementation: The government ought to modify 14 CFR Part 21 to introduce a Critical Systems Independence Requirement which compels independent review of a system that alters or grows pilot control. They should be reviewed by accredited independent certification groups to do the reviews, and the manufacturers seeking certification would cover the cost, which is paid to the FAA.

### **6.2 Increased Criminal Repercussions for Concealment**

Recommendation: Criminalize hiding serious safety defects on the part of the manufacturers, to regulators or the operators. Present legislation permits fraud and conspiracy statutes to be employed by the prosecutors, with no particular aviation legislation to conceal the design defects.

Implementation: The government may enact the Aviation Safety Accountability Act. In that section would be punished individuals and companies of 10-20 years imprisonment and fines of 50 million dollars or more that would be prosecutable at any time<sup>48</sup>.

---

<sup>47</sup> External whistle-blower protections: 49 U.S.C. § 42121 established 2010; effectiveness limited by implementation barriers.

<sup>48</sup> Proposed legislation modelled on Environmental Protection Agency criminal provisions and international aviation safety frameworks.

### 6.3 Strong Protections for Whistle-blowers

Recommendation: Change the U.S. whistle-blower law in such a way that it also applies to individuals who conceal safety issues to the regulators. They should be paid lost wages and reinstated and provided with punitive damages by the law. The existing legislation is a facilitator that is not sufficient to offset the silencing of safety issues.

Implementation: Establish a separate Office of Aviation Safety Advocacy within the Department of Transportation. It is able to receive complaints on safety, enter independent investigations and propose remedies without notifying the manufacturers<sup>49</sup>.

### 6.4 ICAO Safety Culture Audits

Recommendation: Alter ICAO Annex 8 in the sense that plane manufacturers should undergo regular and independent auditing of their safety-culture. These audits must verify whether the structure of the company promotes or restrains safety reporting. The existing ICAO regulations are centred on technical arrangements and lack in terms of organisational governance.

Implementation: ICAO ought to develop Safety Culture Assessment Specifications on human-factor research. Large transport aircraft manufacturers are supposed to be audited after every three years<sup>50</sup>.

### 6.5 Indian Aerospace Product Liability Law Harmonization.

Recommendation: India needs to enact new product-liability legislation of aerospace parts. These would be stricter laws in which manufacturers would be liable in case of defective housing parts and it would suit the existing institutions in India<sup>51</sup>.

Implementation: The Ministry of Civil Aviation is to draft legislation that is in line with the PLD 2024 principles. They need to establish quick courts in selected business courts that work on aviation product-liability incidents<sup>52</sup>.

## 7. CONCLUSION

These accidents with the Boeing 737 MAX reveal a large issue of responsibility in airplane safety. Boeing was careless. It had a flawed MCAS system, concealed issues with regulators

---

<sup>49</sup> Institutional design based on comparable international models (ICAO Safety Advocacy Office, EASA Safety Management).

<sup>50</sup> Safety Culture Assessment methodology based on FAA Aviation Safety Management Systems (SMS) framework, FAA Order 8000.369.

<sup>51</sup> Recommendation based on comparative analysis of Indian institutional capacity and EU PLD 2024 framework.

<sup>52</sup> Institutional design recommendation aligned with Indian judiciary structure and commercial court capacity.

and pilots and was nonchalant about safety issues within the company. This occurred due to over-relaxation of regulators and patchwork of global regulations. Existing regulations do not suffice to resolve gigantic issues with producer bugs and business negligence. A defective aircraft was granted by the FAA, no compulsory repairs were imposed, and the faulty global response demonstrates major vulnerabilities in global aviation safety networks.

The 346 victims of the Lion Air plane 610 and Ethiopian Airlines plane 302 do not require lawsuits; they require an actual change in the law and in the institutions. This research indicates the evident deficiencies in the way manufacturers are held accountable and proposes established remedies to place passenger safety on the forefront of aviation regulation[155]. Independent certification, criminalizing attempts to conceal issues, whistle-blower protection and imposing safety culture inspections are viable changes that would increase the cost and reputational harm of companies that put money ahead of safety. The decision to keep safety first will be a tribute to the 737 MAX victims and prevent the next catastrophe.

The only way this can improve the air safety is through legislation that clarifies that the culprits who prioritize profit over life should be dealt with. We need this now.

