



Aviation Law 2025

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Aviation Safety and Aircraft Certification in the United States

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“Safety” across the broad expanse of the aviation industry depends on three things: designing safe airplanes; safe piloting practices; and effective government oversight of the aircraft manufacturing process and airline flight operations. In this chapter we will focus on some of the issues related to the design of modern aircraft and government oversight limitations. With the rapid advances in artificial intelligence and the added complexity it will inevitably bring to aircraft designs and operations, it is critical that the next generation of aircraft now on manufacturers’ drawing boards and assembly lines have no design deficiencies that could doom passengers as happened in the recent Boeing 737 MAX crashes. The design failures in those aircraft spelled disaster before the planes even left the place of manufacture. That cannot happen again.

The root causes of airplane crashes are human failure and economics. People make mistakes, and airlines and manufacturers cut corners in the pursuit of profit. Excuses after accidents are no comfort to the bereaved. Government oversight has its limitations. The U.S. Federal Aviation Administration (FAA) has a fine set of regulations which set forth safe design minimum standards, but not enough money or personnel to guarantee that design flaws will not creep into new aircraft and their systems. Therefore, the ultimate responsibility for building safe aircraft must rest with manufacturers. Manufacturers who profit from the sale of their products should not be able to shirk their responsibility and shield their ample coffers by arguing that merely following an FAA-issued “minimum standard” protects them from liability.

The people and manufacturers responsible for aircraft design decisions must be held accountable if their products fail. The flying public demands that assurance.

Aviation Safety and Aircraft Certification

There is no question that great strides have been made in aviation safety over the past few decades. Statistics show that flying to your destination via commercial airplane is far safer than driving in your car. Nevertheless, in recent years there have been several tragic and preventable airline disasters and near misses caused by defective aircraft designs and negligent manufacturing processes. The doomed airplanes contained obvious and dangerous design defects, yet the FAA certified those airplanes as airworthy. So, what went wrong?

The U.S. Federal Aviation Act authorizes the FAA to issue regulations and to establish “minimum standards required in the interest of safety ... for the design, material, construction, quality of work, and performance of aircraft ...”, 49 U.S.C. §44701. In the exercise of its regulatory authority, the FAA is

tasked with issuing airworthiness certificates to all aircraft manufactured in the United States. To accomplish this, the FAA reviews the design of each aircraft produced in the U.S. and certifies that the aircraft’s design meets the applicable safety standards. However, FAA certification merely means that at the time of issuance, the FAA concluded that the aircraft met the regulation-prescribed *minimum* set standards. By necessity, the FAA relies heavily on the aircraft manufacturers’ input to make that determination. Importantly, the FAA cannot be held liable to accident victims for design mistakes – but manufacturers can be. *United States v. Varig Airlines*, 467 U.S. 797 (1984).

The FAA faces challenges that limit its oversight of aircraft safety, including limited staffing, budgetary limitations that prevent it from hiring more staff, and a lack of subject matter expertise among its existing staff. So, the FAA leverages its limited resources by relying on the personnel and resources of aircraft manufacturers to conduct the testing, reviews and analysis required to make its aircraft certification decisions.

49 U.S.C. § 44702(d) authorizes the FAA to delegate certification functions to private entities, like aircraft manufacturers. Since 1940, the FAA has allowed aviation manufacturers to conduct certification functions on its behalf by granting certain employees of the manufacturers the privilege of acting as Designated Engineering Representatives (DERs) to conduct type certification and make certification decisions on its behalf. More recently, in 2009, the FAA instituted the Organization Designation Authorization (ODA) process, which allows manufacturers to conduct certification work on behalf of the FAA with limited supervision and without direct FAA oversight. See 49 U.S.C. § 44736. Manufacturers with ODA status are given authority that may include issuing airworthiness certificates, production certificates and type certificates. In essence, federal law allows the FAA to rely on the ODA manufacturers to certify the airworthiness of their own aircraft – an inherent conflict of interest. In the real world, one must question whether those with ODA authority favor the manufacturer or the FAA.

Despite the broad delegation to aircraft manufacturers, the FAA has always denied that manufacturers are able to self-certify their aircraft. Nevertheless, for many years, safety concerns have prompted debate about whether the FAA has become too reliant on manufacturers in the certification process. Investigations into recent disasters and near-misses revealed dangerous aircraft defects that were obvious, but never identified by the FAA. These investigations disclosed just how heavily the FAA relies on the manufacturers to certify their own aircraft and how little independent oversight the FAA exercises over the process.

The Boeing Dreamliner

On the morning of January 7, 2013, shortly after 183 passengers and 11 crew members deplaned Japan Airlines Flight 008 at Boston's Logan International Airport, a mechanic noticed smoke and flames coming from the airplane's auxiliary power unit (APU) battery. The airplane was a Boeing 787-8 Dreamliner that Boeing had delivered to the airline only 18 days prior. The fire was caused by a thermal runaway in the APU's lithium-ion battery – the same model used for the 787's main battery. Nine days later, a Dreamliner operated by All Nippon Airways was forced to make an emergency landing after the pilots received a battery malfunction warning. These two events spurred the FAA to ground the entire Dreamliner fleet. The National Transportation Safety Board (NTSB) investigated the Japan Airlines fire and found Boeing and the FAA at fault for the design, manufacture and certification of the Dreamliner's lithium-ion battery system. Most troublingly, the NTSB discovered that production deficiencies caused a short circuit in the batteries that resulted in the fire. The NTSB faulted Boeing's assumptions that a short circuit would be contained and that it did not have to incorporate design changes that would have protected the system from fire. The NTSB also faulted the FAA for not requiring a thermal runaway test as part of its certification requirements.

The Dreamliner debacle highlights the role that manufacturers play in the certification process. Boeing's assumptions directly influenced what protocols the FAA deemed necessary for the aircraft's certification process. Had Boeing recognized that a thermal runaway was possible, the FAA would have taken a much harder look at the system and certainly would have required enhanced safety testing.

The Boeing 737 MAX

On December 15, 1967, the FAA issued a Type Certificate for the first Boeing 737-100. DOT FAA Type Certificate Data Sheet A16WE. Forty-four years later, Boeing unveiled plans for the 737 MAX, a modern upgrade of the 737. On January 27, 2012, Boeing applied for an Amended Type Certificate for the Boeing 737-8 MAX, which the FAA accepted on March 22, 2012. US Department of Transportation, Office of the Inspector General, FAA Report No. AV20200037, June 29, 2020. ("DOT OIG Report") at 11, 12. The MAX design was based on the earlier generation 737 model, the Boeing 737-800, and the decision to apply for an Amended Type Certificate, rather than a new type certification for a new aircraft design, was a shortcut that helped streamline the certification process. That shortcut was intended to allow Boeing to avoid certain new certification requirements. What was most troublesome about these shortcuts was that the MAX had undergone significant design changes compared to the 737-800. In particular, the MAX incorporated more fuel-efficient engines that were significantly larger than the ones on the 737-800. Early wind tunnel tests revealed that, due to the larger engines, the airplane would tend to initiate a nose-up pitching movement at certain flight conditions and thus would be at risk of not meeting certification requirements. Boeing decided to address this problem by adding the Maneuvering Characteristics Augmentation System (MCAS), a computer code programed into the airplane's flight control computers that would command nose-down trim when the airplane's angle of attack was too high. Boeing also convinced the FAA not to require simulator training for pilots transitioning to the MAX from the 737-800, claiming that the MCAS would never engage in a normal stage of commercial flight. And because the MCAS

was intended to be transparent to pilots, the training materials did not even identify or provide information about the new system. Disaster was built into the 737 MAX.

Lion Air Flight 610, a Boeing 737-8 MAX, crashed into the Java Sea on October 29, 2018, with 189 souls aboard. In the minutes before the crash, the pilots fought a terrifying battle with the airplane's MCAS, which repeatedly pushed the nose of the airplane down toward the ocean.

The reason? One of the airplane's angle of attack sensors fed erroneous information to the MCAS, causing it to "believe" that the nose of the airplane was too high. This then triggered the MCAS to repeatedly push the airplane's nose down.

The Lion Air investigation quickly identified the MCAS problem and that pilots did not have sufficient information and training to cope with the automatic MCAS inputs. Put another way, the pilots did not understand what was happening to their airplane. The FAA, however, elected not to ground the MAX. Even though the Lion Air disaster revealed the MCAS problem, 737 MAX pilots were not warned about the MCAS or sufficiently trained on how to respond to emergencies the MCAS created that could potentially cause disaster.

Airlines all over the world continued to fly the airplane until the crash of Ethiopian Airlines Flight 302, another 737 MAX 8, on March 10, 2019. Investigators found that shortly after takeoff from Addis Ababa, an angle of attack sensor once again sent erroneous information to the airplane's MCAS. Just as in the Lion Air Crash, the Ethiopian pilots helplessly battled the runaway system until the plane nose-dived into farmland, taking with it 157 lives.

Remarkably, after the second crash and 346 deaths, the FAA still resisted grounding the MAX fleet. Indeed, on March 12, acting FAA Administrator Daniel Elwell issued a statement that the FAA had found "no systemic performance issues" and had "no basis" to ground the airplane. The next day, however, Canada grounded the airplane, and later that day, then-President Donald J. Trump announced that the US would ground the Boeing 737 MAX 8 and 9 airplanes.

The Boeing 737 MAX 8 crashes brought much-needed public attention to the all-too-cozy relationship between the FAA and the aviation industry and the FAA's vulnerability to manufacturer influence. Congress stepped in and in December 2020 passed the Aircraft Certification, Safety and Accountability Act (ACSAA). The ACSAA aims to overhaul the FAA's certification process by tightening lapses in FAA oversight highlighted by the troubled safety culture at Boeing that investigators determined contributed to the crashes. The ACSAA requires the FAA to increase its oversight of ODAs and to maintain direct control over the manufacturer employees engaged in certification activities. It is too early to know whether the changes prompted by the ACSAA will improve product safety, but the recent blowout of a door plug on an Alaska Airlines Boeing 737-9 MAX brought new attention to the safety of airplanes manufactured in the U.S. and revealed that there remains significant room for improvement at Boeing.

The FAA issued an airworthiness certificate for the Alaska Airlines 737-9 MAX in October of 2023 and shortly thereafter Boeing delivered the aircraft to the airline. The airplane flew for three months and over 150 cycles before it experienced a terrifying midair blowout of its door plug, which was found to have been installed without retaining bolts at the Boeing factory. Fortunately, the event occurred at relatively low altitude, and in an airplane that was not quite full. Amazingly, the seats immediately adjacent to the door plug were empty.

Despite these recent events, manufacturers still try to limit their responsibilities to victims of aviation crashes by arguing

that they cannot be liable for accidents unless the aircraft failed to meet the minimum standard set by the FAA for the aircraft design. They argue a Jury should not be able to find that an FAA-certified airplane was defective, *even after a crash caused by a design defect*.

Manufacturers Are Not Entitled to Immunity Because of FAA Certification

The last 25 years have seen legal battles fought in U.S. courts over what legal standards should apply in products liability cases arising from aviation disasters. In the United States, products liability cases are litigated under state laws. These laws render aviation manufacturers liable if a defective product causes injury. An aircraft or component part is deemed defective if, by reason of its design, it is unreasonably dangerous.

In cases brought by victims after aviation crashes, however, manufacturers tend to argue that a Jury should not be able to find that an aircraft or component part is unreasonably dangerous, absent a finding that it did not comply with the minimum design and manufacturing standards established under federal laws and regulations. In short, manufacturers would like to focus on FAA minimum standards while the test should be whether a product is unreasonably dangerous by design.

The FAA has no requirements that aircraft must be safe or free from defects. This is in contrast with aviation operations, where the FAA promulgated a general standard of care that prohibits the careless or reckless operation of an aircraft in addition to specific requirements concerning aircraft operation. See 14 C.F.R. § 91.13(a).

A recent case is instructive. The court reasoned that a jury's verdict that an aircraft was defective would "conflict" with the FAA's certification of the airplane as airworthy. That would mean that absent unusual circumstances – like a manufacturer's fraud during certification – the manufacturer would be immune from civil responsibility to the aviation victims. See *Sikkelee v. AVCO Corp.*, 268 F. Supp.3d 660 (M.D. Pa. 2017) (claims against manufacturers are barred under the doctrine of contract preemption if FAA regulations make it impossible for the manufacturer to unilaterally implement a plaintiff's proposed design change), reversed in relevant part, 907 F.3d 701 (3rd Cir. 2018) (state law claims against manufacturers can go forward unless the defendant can show that the FAA would not have approved a plaintiff's proposed design change). Fortunately for plaintiffs, the appellate court overturned the decision. It remains unsettled, however, whether federal law preempts state law, and how the court would apply federal standards in determining whether an aircraft or component part was defective.

Victims of airline disasters have long pointed out that Congress intended for the Federal Aviation Act to improve aviation safety and that it certainly was not a tort reform measure. It would be inconsistent with this goal to find that

Congress also intended to reduce product safety standards to the "minimum standards" promulgated by the FAA when it passed the Federal Aviation Act.

The FAA historically has sided with the industry in litigation fights, supporting the manufacturer's argument that the Federal Aviation Act "implicitly preempts the field of aviation safety with respect to the substantive standards of safety [and that] while the act does not preempt state tort suits, it is federal standards that govern state tort suits based on design defects in aviation manufacturing". This is the position that the FAA took in its amicus submission in *Cleveland v. Piper Aircraft Corp.* The U.S. Court of Appeals for the Tenth Circuit, however, discounted the FAA's submission as lacking statutory support. The FAA also supported the industry's arguments that a product liability claim cannot proceed if the FAA expressly approved the specific design, or if compliance with both the type certificate and the claim in the lawsuit is a "physical impossibility". *Letter Brief for Department of Transportation and Federal Aviation Administration at p. 1-2, Sikkelee v. Precision Airmotive Corp.*, No. 14-4193 (3d Cir. argued June 24, 2015).

The FAA's position in court cases promotes the industry's interests over aviation safety and demonstrates the oversize influence the aviation industry still has over the FAA. The position not only effectively reduces product safety standards to "minimum standards", but it also undermines the deterrent value that potential liability has on manufacturer conduct. The FAA's minimum standards should not insulate a manufacturer whose product incorporates a defective design.

We urge the FAA to drastically reevaluate its relationship with manufacturers. It needs to step back from industry and fulfill the Congressional intent that the FAA be independent from industry influence and pressure. One way the FAA could fulfill its statutory mandate would be to issue a regulation that generally requires aviation manufacturers to ensure that their products are free from defects. A "defective" standard would raise the general standard of care governing aircraft safety and mitigate disputes caused by the current "minimum standards" criteria. Such a regulation would ensure that the ultimate responsibility for aircraft safety rests on the manufacturers and eliminate attempts by manufacturers to avoid their responsibility based on FAA certification.

Aviation manufacturers have the expertise and resources to ensure that their aircraft are properly designed, tested and manufactured. Manufacturers earn billions of dollars selling commercial aircraft and can absorb the financial losses caused by aviation disasters involving defective products. This is how products liability law was designed to work – and does work – in most other industries.

Aviation manufacturers should not be given special protections that insulate them from liability for failure to manufacture safe products just because they are subject to FAA regulation. And air crash victims cannot be left without legal recourse when the agency charged with keeping air travel safe cannot guarantee the efficacy of its work.



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Following the September 11, 2001, terrorist attacks, Mr. Moller was chosen as the Plaintiffs' Liaison Counsel for all attorneys representing personal injury and wrongful death cases consolidated into the litigation. He has also led landmark cases, including *in re Sabin Oral Polio Vaccine Products Liability Litigation*, which at the time established the liability of the U.S. government for mandatory regulatory violations.

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Founded in 1950, Kreindler is the world's preeminent aviation accident law firm. Kreindler attorneys have been lead counsel in nearly every major airline disaster case, as well as countless private, charter, military, general aviation and helicopter cases. Our experience with aviation accident cases is unmatched by any other airplane and helicopter accident law firm in the world. Our attorneys who focus their law practice on representing victims who have been in an aviation crash have an unprecedented history of securing record amounts of compensation for victims and their families and promoting improvements to aviation industry safety standards, practices, laws, and regulations.

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