

Removal of Quality Control Inspections Adds Risk to Boeing Airplanes

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There have been several airplane incidents in the news recently including near misses around airports, but this report is a different kind of scary. Within weeks of the Lion Air Flight 610 disaster, Boeing executives told their employees at the company's Everett, WA site about a new quality improvement initiative called *Boeing's Quality Assurance (QA) Transformation Plan*. Two months later, Boeing publicly announced this corporate-wide initiative. Ethiopian Airlines Flight 302 crashed two months after the public announcement. Please keep reading. This is not a story about the two crashes.

The QA plan involved the removal of quality control inspections and a reduction in the number of quality control inspectors. By removing quality control inspections and inspectors, the company could speed up production, sell more airplanes, and make more profit. This initiative started at the company's 737 factory in Renton, WA before the MAX airplanes were built.

This misguided profit driven initiative resulted in the removal of thousands of quality control inspections on every single 737 MAX airplane. The wholesale removal of inspections adds significant instability in manufacturing environments and increases risks to the flying public. The removal of quality inspections eventually spread to all of Boeing's commercial airplane programs including the 777, 767, and 787. It even impacted Boeing's KC-46 military tanker aircraft program.

Thus, hundreds of Boeing airplanes (that have already been delivered to customers) received thousands of less inspections due to this cost-cutting effort. These inspections were an integral part of Boeing's quality system and the FAA's production certificate. This critically important certificate requires Boeing to demonstrate how they will build an airplane to conform to all quality and engineering requirements. It is this document that specifically authorizes Boeing to build and sell airplanes. The production certificate requires Boeing to build airplanes with the same or better repeatable level of quality.

How Did This Happen?

As a Boeing airplane like the 737 MAX goes down the assembly line, hundreds of manufacturing, quality, and engineering employees working three shifts build the airplane. Each employee has specific jobs to complete. Many jobs require employees to obtain quality inspections by trained quality inspectors prior to proceeding to the next step in the build process. "In-process" inspections have been in place for years. They undoubtedly contributed to the 737's decades long reputation of superior quality.

Of course, there were good reasons these quality inspections were put in place including prior accidents. A second set of eyes can catch defects that a fatigued, rushed, or inexperienced employee can miss. These are common challenges in every occupation. This initiative also resulted in the loss of approximately 900 highly trained quality control inspectors. Like most factories and production environments, quality control experts are not easy to replace. This is especially the case for industries with extremely high standards like the aviation industry. In most cases these professionals worked as mechanics, technicians, electricians, etc. before they were promoted into quality control positions.

Since the company implemented this initiative, Boeing's production environments have been plagued with systemic quality problems resulting in the loss of billions of dollars to Boeing alone. No doubt Boeing's customers have also paid a price for Boeing's quality lapses and will continue to do so.

The initiative itself was fully supported by Boeing's corporate leaders and championed by former Toyota quality executives that had been hired by Boeing. The belief was human in-process inspections were inefficient and they could be better replaced by "verifications"; manufacturing employees self-certifying their own work; statistical analysis based on random sampling; and/or the use of other technologies.

The FAA Was Supposed to Review These Kinds of Changes

From the Code of Federal Regulations (Title 14, Ch 1, Subchapter C, Part 21, Subpart G, Section 21.150)

§ 21.150 Changes in quality system.

After the issuance of a production certificate -

- *(a) Each change to the quality system is subject to review by the FAA; and*
- *(b) The holder of a production certificate must immediately notify the FAA, in writing, of any change that may affect the inspection, conformity, or airworthiness of its product or article.*

The FAA Was Unaware of What Was Going On

The FAA was unaware that Boeing had removed thousands of mandatory inspections. The removals of inspections occurred using internal documents that were hidden from the FAA. Multiple Boeing employees reported this unethical (illegal?) behavior to Boeing management and were compelled to file official complaints with the FAA when management refused to address their concerns.

It took regulators more than a year before they realized the seriousness and full scope of the allegations. The FAA then demanded Boeing stop removing inspections via official compliance findings. Boeing pressed ahead continuing to modify their internal build records and inspection requirements by continuing with the removal of inspections. In January 2023, the FAA perhaps unknowingly or simply worn down by Boeing's tenacity, approved Boeing's latest documentation fully authorizing the replacement of inspections with verifications, allowing manufacturing employees to self-certify their own work, and assigning quality conformance decisions to manufacturing employees. The FAA caved.

Airplane Safety Risks

Although Boeing's union leaders successfully fought to reinstate many of these inspections, there is no plan for the hundreds of Boeing airplanes that are currently in service around the world that left the factories without those thousands of inspections. In other words, there is no containment plan.

Predictably airlines are reporting large numbers of 737 MAX system malfunctions indicating a wide range of production quality defects. Recent malfunction reports document inflight failures involving multiple systems and components. These malfunction reports contain telltale signs of production quality defects including electrical/electronic problems involving multiple systems and components; intermittent occurrences; components flipping from on to off and back again; systems experiencing erratic or unexpected behavior; and airline maintenance personnel writing up "no fault found" or "could not duplicate" troubleshooting reports. One U.S. airline submitted at least 418 system malfunction reports on 40 MAX airplanes in 2022. The average age of the planes was one year old.

The FAA Needs to Act

There are approximately 300 MAX airplanes operating in the U.S. and about 700 MAX airplanes operating outside the U.S. These foreign airlines are not required to submit malfunction reports to the

FAA. Thus, Boeing, the FAA, the DOT, and the NTSB have no way of knowing how these airplanes, or for that matter, how any Boeing airplane is operating overseas based on incident reporting.

Impressive but biased and incomplete operating statistics spread across a fleet of airplanes can mask the safety of individual airplanes and lull passengers into thinking everything is fine as we have seen. One might argue that 737 MAX airplanes have flown millions of miles with hundreds of thousands of “safe” departures but extrapolating out the malfunction rate of the U.S. airline previously mentioned to the MAX fleet operating outside of the U.S., equates to thousands of unreported system malfunctions. The sheer quantity of malfunction reports is troubling, but what is even more concerning, is the content of the reports. Adding to the danger are confusing alerts from the MAX’s outdated crew alerting system.

Another disturbing factor is that airlines, Boeing, the FAA, and aviation reporters continue downplaying these 737 MAX incidents as “normal” and “routine” and/or not statistically relevant. This blanket characterization of incidents is outrageous and unacceptable. MAX pilots frequently use their “Non-Normal” paper checklists to deal with most of these malfunctions. It seems normal and routine incidents only cross the line into something worthy of a thorough investigation after they get a lot of social media attention or until an accident occurs—hardly an effective, proactive approach to accident prevention.

DOT - FAA Order 8120.23A requires the FAA and airplane manufacturers to investigate these reports, determine root causes, and correct these conditions. Legislation and regulations like this were setup for a reason: to prevent future accidents. Incident reports are warning bells. Why would FAA, Boeing, or airline employees spend time investigating incidents when their bosses say not to worry?

Making matters worse, FAA claims the results of these incident investigations are exempt from Freedom of Information Act (FOIA) reporting requirements. They claim this restriction is to protect Boeing’s proprietary information. This is absurd. Boeing routinely shares engineering details with their airline customers and has been for decades.

The public should have the right to access and analyze this incident information for themselves. This FOIA restriction prevents the public from holding the FAA, manufactures, and airlines accountable to properly investigating incidents and fixing the problems. We fund the FAA and deserve this information.

Aviation professionals and accident investigators frequently talk about the “Swiss cheese model” of accident causation. In theory each slice of cheese represents a barrier to preventing an accident, however each slice has holes, and when these holes align an accident can occur. History also shows us that Swiss cheese slices tend to naturally align on airplanes with latent defects and/or chronic problems as pilots and maintenance personnel become acclimated to submitting “routine” maintenance writeups.

What is the prudent thing to do? Ground and inspect the airplanes, investigate Boeing’s quality program and the chronic production problems, or continue rolling the dice? The prudent and right thing to do seems to depend on whether you are sitting inside the executive headquarters of Boeing, the FAA, or the airlines, or about to put a loved one on a Boeing airplane. This information needs to get out to the public. I urge readers to share this report and demand action from our government.

~Ed Pierson
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