FAA Issues Warning of Fuel Tank Explosions on Boeing 777s from Lightning Strikes

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The United States Federal Aviation Administration (FAA) issued an urgent airworthiness directive (AD) in response to errors identified in Boeing's Requirements Bulletin (RB). These oversights left certain Boeing 777 aircraft vulnerable to inadequate protection against lightning strikes.

Initially, in September 2022, the FAA issued an AD addressing "cracking of the left- and right-side ring chords, repair angles, front spar lower chords, and front spar webs (depending on configuration) common to the underwing longeron located at station (STA) 1035."

This directive was prompted by reports of cracks discovered on a Boeing 777-300ER's front spar lower chord during underwing longeron replacement. These cracks, in conjunction with damage to the front spar web, posed safety hazards, including the potential for fuel leaks or, in more severe cases, structural integrity issues for the aircraft.

According to a recent FAA AD, Boeing identified errors in its October 2021 RB. These errors pertain to the application of cap seals to fasteners penetrating the center wing fuel tank, introducing an additional, pressing safety concern.

The actions mandated by both the October 2021 RB and the September 2022 AD necessitate the removal of numerous cap seals to facilitate various modifications and inspections.

The FAA directive emphasizes that this directive, which now requires inspection and the replacement or modification of the center wing fuel tank fastener cap seals, is being published "without additional service information" due to the associated public safety risks.

The FAA explained that Boeing submitted documentation of these errors in July 2023, acknowledging the complexity of the new RB. Although Boeing pledged to revise the bulletin, the FAA noted that "the required work will take longer to complete than what is deemed safe for public safety," prompting the agency to supersede the AD from September 2023.

The FAA identified three procedural errors regarding fastener cap seals:

- Operators were not required to apply cap seals to fasteners related to the underwing longeron of certain Boeing 777s, potentially compromising the fuel tank lightning protection design. Airlines operating these Boeing 777s must now apply the correct cap seal of the appropriate sealant type.
- Some Boeing 777s lacked specified cap seal thickness requirements, and the RB incorrectly referred to the Boeing Standard Overhaul Practices Manual (SOPM) section 20-50-19 for cap seal application procedures. The SOPM's requirements called for a cap seal thickness half of the required amount. To address this, operators must ensure the minimum required thickness and sealant type, replacing any improperly replaced seals.
- The RB called for the removal of specific fastener cap seals without specifying whether the cap seal should be replaced or providing a thickness requirement for the replacement seal. This jeopardized the fuel tank's lightning protection. Airlines are now required to replace the removed seal with the correct thickness and type.

Boeing has already implemented design changes to address the issue, exempting newly built Boeing 777s from the latest directive's impact.

The FAA estimates that 291 Boeing 777s in the US will be affected by this directive. Additionally, since the September 2022 directive, Boeing has already implemented the necessary design changes for newly built aircraft with Line Numbers (LN) higher than 1,743.

In its latest AD, the FAA has retained three actions from the September 2022 directive: inspection, modification, and post-modification inspection. Two new actions have been added, requiring airlines to review their Boeing 777 maintenance records and properly seal the caps.

The FAA acknowledges that it "has no way of determining the number of aircraft that might need the cap sealing."

According to the agency's estimates, sealing will require airlines up to 109 work hours. With parts ($90) and labor ($9,265), the action will cost $9,355 per aircraft. Some of the costs associated with these actions could potentially be covered under warranty.

The AD is scheduled for publication on August 31, 2023, and will take effect 15 days after publication.

Sources: AirGuide Business airguide.info, msn.com, federalregister.gov, aerotime.aero