

Proposed Special Condition on Fuel Tank Safety

Applicable to Large Aeroplane category

Introductory note:

The following Special Condition has been classified as an important Special Condition and as such shall be subject to public consultation, in accordance with EASA Management Board decision 12/2007 dated 11 September 2007, Article 3 (2.) of which states:

"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

Statement of Issue

Following various in-service events, including the Boeing 747-131 accident which occurred on 16th of July 1996 off Long Island (TWA flight 800), FAA and JAA have required Type Certificate holders to conduct fuel tank safety design reviews in order to verify that their products did not feature any unsafe condition possibly associated with fuel tank safety.

FAA issued SFAR 88, which mandated FAR 25.981 as introduced by Amdt 102, and JAA required the European Member States to conduct design reviews per JAA INT/POL/25/12.

It should be noted that, while it is commonly stated that the products which were reviewed are 'SFAR 88 compliant' or 'INT/POL compliant', actually it was not practical for most designs to demonstrate full compliance to FAR 25.981 as introduced by Amdt 102.

Instead, FAA and JAA agreed to pragmatically use an additional filter – e.g. harmonized unsafe condition criteria – to determine which corrective actions would be required to close the fuel tank safety design reviews.

The unsafe condition criteria made a distinction between low and high flammability exposure tanks; while for high flammability exposure tanks full FAR 25.981 compliance was required, for low flammability exposure tanks the criteria relied on addressing 'no single failure', 'no known combination of failures', and 'no adverse in-service experience'.

These design reviews were conducted as a one-time exercise, and most of them were completed by 2002/2003. On most designs their outcome prompted issuance of Airworthiness Directives to correct specific unsafe condition(s).

Issuance of ADs on products fully compliant with their original certification bases demonstrates the original fuel tank safety requirements were not adequate. The certification basis, however, were not updated, and still features the requirements established for the original certification of the product. This resulted for subsequent design changes - potentially affecting fuel tank safety - in having a certification basis less stringent than the design review previously conducted to address SFAR 88.

For post SFAR 88 design changes, it appears there is confusion about the requirements that need to be applied for considerations related to fuel tank safety.

For instance: applicants may claim that the relevant design changes are 'SFAR 88 compliant', without adequately clarifying if this statement addresses FAR 25.981 at Amdt 102, or the unsafe condition criteria. Other variants are that applicants state that the design changes "do not challenge SFAR 88 compliance" without clearly defining the meaning of 'challenge', or SFAR 88. In all cases, this appears as a voluntary statement, as neither SFAR 88 nor INT/PO/25/12 have been formally introduced in the product certification basis.

Furthermore, the initial certification basis (typically, FAR 25.981 pre Amdt 102, or JAR / CS 25.981 pre Amdt 1) has been shown to be inappropriate as fully compliant designs had to be modified with corrective actions (including maintenance actions) to address the potential unsafe conditions.

Relying exclusively on the unsafe condition criteria is not satisfactory. This criteria allowed to determine the existence of unsafe conditions, prompting the issuance of Airworthiness Directives, but were not drafted to address the safety objectives normally targeted for Type Certification.

Therefore, instead of JAR 25.981 at change XX(*), irrespectively of any Change Product Rule consideration, the applicant shall comply with the requirements of the Special Condition and the relevant Guidance Material as detailed hereafter :

(*) Change XX is the applicable JAR change for the specific product against which the Special condition is being raised.

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- Fuel Tank Safety -

Whenever a 'Fuel Tank Safety' Condition is part of the certification basis of a given product, the applicant shall demonstrate that any design change potentially affecting fuel tank safety is compliant with CS 25.981 as modified at Amendment 1, and its associated guidance material as found in AMC 25.981(a).

From the release date of this Special Condition, any qualification activity should consider up-to-date standards, as delineated in the AMC to 25.981(a), instead of relying on older, obsolete standards.

Note 1: It is fully recognized that on an existing designs this approach might not be always practical. In such cases, the applicant, with the explicit agreement of EASA, might consider alternatives to this Special Condition.

Note 2: CS 25.981 post Amendment 1 and FAR 25.981 post Amendment 102 are Significant Standard differences (SSD). While both requirements have their own backgrounds and merits, it certainly appears that some specific text of FAR 25.981 is difficult to address, for instance the considerations related to latent failure not shown to be extremely improbable. EASA clearly does not intent to pre-empt the application of FAR 25.981 at Amendment 102 with this Special Condition; it is EASA's understanding that FAA is working to establish a policy on this topic. Since both rules are SSD, the assessment associated with Change Product Rule (21.101 and associated guidance material) might result in different decisions regarding the need to update the original certification basis.