



COMMENT RESPONSE DOCUMENT

EASA CRD of Equivalent Safety Finding on CS 25.1181 (Designated fire zones : regions included) & 25.1182 (Nacelle areas behind fire walls and engine pods attaching structures containing flammable fluid lines)

Applicable to Large Aeroplane

[Published on 12 January 2017 and officially closed for comments on 04 February 2017]

Commenter 1: TCCA – Cousineau Y. – 04 February 2017

Comment # 1 - General

Shouldn't the design certification authorities (including EASA) provide guidance and interpretative material on demonstrating compliance instead of avoiding compliance by a means of non-compliance finding of equivalent safety?

In other words, since the authorities can and should establish certification requirements that are pertinent, why provide guidance to applicant how to request and document non-compliance when they could revise the certification requirements as proven by experience?

EASA response: Noted.

EASA acknowledge that rule revision is desirable, but when the rule is doing its purpose, like CS25.1181/25.1182, it is also EASA's opinion that there is no specific need to revise a rule.

In addition, in the perspective of a certification project, it is not practical to initiate a rulemaking task as this would jeopardize project completion. Part of EASA process for initial certification, a path for equivalent level of safety is offered and when an ESF approach is pursued then the ESF CRI shall be publically consulted.

No applicant is fully compliant with the letter of the rule, hence the ESF route is retained. This specific Condition consultation allows applicant to have visibility on the problematic and ease their certification process, it also precise some historic on the rule and EASA practices which equivalent visibility from other airworthiness authorities is not fully offered due to no AMC/AC. At this stage, EASA is not in a position to define acceptable means of compliance, or might risk dictating prescriptive design measures limited to the recent EASA experience.

It shall be noted the ESF route has also be retained in the past for assessing compliance of fan zone against 25.1181, when the applicant wanted to declare it as a FFLZ instead of a DFZ as per the rule. Finally, EASA had discussion on the proposed Condition wording with FAA since rule owner (FAA IP P-20 ESF on the B737MAX).



Comment # 2 : General

On the wording side, EASA is increasing the meaning of “behind” to include “adjacent”. EASA should be consistent in their use of vocabulary, dictionary definitions or when set in soft or hard laws.

EASA response: *Disagreed.*

EASA use of “adjacent” is coming from the engine pod attaching structure (the pylon). As worded, 25.1182 applies to the complete pylon however most current pylon features multiple zones and we are trying to distinguish between the adjacent ones and the others (which are 'adjacent to the adjacent'). The wording “adjacent” is simply factual transcription of EASA practices for “immediately behind”. As far as EASA awareness, there is no specific TCCA/FAA advisory material definition and/or interpretation for 25.1182.

Comment # 3 : General

On the historical background of the requirements, both AWM chapter 525 and CS 25 are derived from FAR part 25 but CS 25 reserved reciprocating engine requirements to clearly prevent piston engine powered aircraft to be certificated to Large Aeroplane certification specification.

At the origins of Fire Protection requirements for powered aircraft (even prior to 1965 FARs), engines (and fuel-burning heaters) have been required to be isolated from the rest of aircraft by fire-walls or enclosed in fire proof compartments. The engines zones or compartments are required to be equipped with fire detection and extinguishing. 25.1181 evolution was to refine designated fire zoning and at the amendment 25-11 in 1967, 25.1181(c) was duplicated into a new 25.1182 requirement to address the classical nacelle configuration for propeller driven airplanes where a pair of these nacelles contained the retractable landing gear. While both the new 25.1182 and 25.1181(c) assumes a vertical firewall (“nacelle area immediately behind the fire wall”), the requirement of 25.863 did not carry over from 1181(c) to 1182, as it was proposed in 1965 to delete 25.1181(c) [ref NPRM 65-43 proposal 16] In Final rule 25-11, 25.1183(c) including 25.863 was maintained. The 1182 split from 1181(c) allowed a separate evaluation of fire protection means between inside the DFZ and the nacelle area immediately behind the firewall.

It should be noted that acceptable means to combat fire in that 1182 zone can be divided in four possibilities: 1. None; 2. by others means such as opening the landing gear bay to snuff out a fire; 3. be part of the fire extinguishing agent discharge distribution; 4. or have their own separate extinguishing agent discharge. Obviously, if the action to fight a fire in the nacelle area behind the firewall is separate from the action to extinguish a fire in the DFZ (second and fourth option above) then an independent fire detection and annunciation would be required because fire detection and crew response are related (refer to 25.863(c)). It appears that 25.1182 should be revised to require compliance with 25.863 i.e. fire prevention means are applicable for these nacelles areas when they contains flammable fluids leakages sources.



In conclusion, I am concerned that EASA is forgetting the need to elevate scrutiny when dealing with an equipment bay behind the firewall on propeller driven large airplanes where a more careful evaluation of the means to prevent fire propagation (including detection) to the rest of the airplane is needed.

EASA response: Partially agreed.

On the TCCA summary of the rule historic, EASA does not have major comments since it correlates the historical search and discussion held with the rule owner (FAA).

However EASA does not fully concur on the statement that “vertical” firewall are uniquely intended to be addressed by the rule, literally speaking the rule does not condition its applicability to a firewall orientation. An horizontal firewall such as a pylon floor, or for a tail fuselage embedded engine, the horizontal fuselage floor, cannot be excluded. EASA considers any firewall.

With regards to acceptable means to combat fire in a CS 25.1182, EASA is relatively in line with TCCA statement and offer the following comments: literally, the CS 25.1203 rule applicability is not conditioned by presence of mean to control fire. An assumption of crew action would require first a crew awareness, this does not mean limited to activate a fire control system but might simply require a diversion action. On this basis, compliance to CS 25.1182 is being investigated by compliance to each individual rules called by CS 25.1182, and not in potential connection to each other.

EASA is recognizing that for clarity CS 25.863 could be included into CS 25.1182 (as done for CS 25.1181) where the prevention intent is of necessity (and not only protection). However it is EASA practices that CS 25.863 is applicable to all aircraft zones where flammable fluids are (including from leaking in a different zone, including a CS 25.1182 zone). It is also recognized that today’s AMC 25.863 is relatively poor in guidance. EASA is aiming to introduce a similar interpretation as existing in the FAA DRAFT Mega AC for 25.863, never published but introduced progressively by FAA by Issue Paper that was adopted recently by EASA, is giving an appreciable level of considerations for showing compliance (FFLZ, DFZ and fire zone definitions, interactions with CS 25.1309, minimization completeness, etc). This material is indeed rendering a fire zone (not a DFZ) like a landing gear area with a nominal ignition source (brake temperature) difficult to be certified without mitigation mean for controlling a fire (i.e. detection plus landing gear extension).

EASA does not share the TCCA statement that scrutiny elevation would be forgotten for equipment bay behind firewall with propeller, as far as concerned, the CS 25.1181/CS 25.1182 rules do not differentiate a turbofan installation from a turbo propeller installation as long as flammable fluid are present in zones behind/adjacent to firewall. A zone without flammable fluid (including migration) would neither be under applicability of CS 25.1182 nor of CS 25.863. However, CS 25.1309 would require with CCA and associated PRA to address fire risk in any aircraft zone including such a zone. Among fire threat assumption, an ignition source on the separating firewall from a fire in the opposite zone would be required. Current nacelles tend to be bigger and more complex (larger diameter resulting from BPR increase). More and more components system are being found in pylons (i.e. hydraulic accumulators). Current nacelle tend to be bigger and bigger with more and more composite materials, with backside out-gasing and ignition reinforce the need for robust compliance with 25.1182 (and other fire rules), which is aimed with this ESF approach by clearly identifying the mitigation means.



Commenter 2: Bombardier – Waigh D. / Core airworthiness / Regulatory Affairs specialist – date 03 February 2017

Comment # 1 : General

The EASA draft CM reflects Bombardier practice and what Bombardier has done on past programs, therefore Bombardier have no objection to the material as drafted.

Bombardier has not seen consistency among Authorities, on a number of certification programs, with regards to what zones need be considered by ESF versus compliance, particularly within the installed powerplant (PP side of the pylon). Additional details and examples of zones where an ESF, or compliance standards, and clarification pertaining to the subject requirements will assist Industry.

As this is becoming an established and normal certification practice, Bombardier would prefer the Authorities create guidance on the subject that avoids the need for creating ESF's, that is, define accepted practices. As these practices have been used & accepted on many aircraft by similar methods can they not be used to assist in defining an accepted interpretation to avoid creating generic ESF's.

EASA response: Noted

As a means of clarification, the paper under consultation is an ESF Condition and not a Certification Memorandum (CM). Part of EASA process for initial certification, whenever dealing with new ESF Condition, shall be publically consulted. Note that a similar ESF exists on the B737MAX (FAA IP P-20 ESF).

EASA thanks Bombardier for sharing their experience as very little or no guidance is publically available with TCCA rules, FAA rules, other NAA rules including EASA until release of this Condition, therefore rendering the visibility of interpretation across airworthiness authorities relatively limited.

It should be noted that the 25.1181/25.1182 rules being relatively similar across FAR/CS/CAR, no specific SSD/VI have been identified further hiding the different possible interpretations when performing validation.

EASA acknowledge that offering guidance (AMC/CM) is desirable but does not anticipate that guidance could solely be sufficient to avoid the need of ESF.

No applicant is fully compliant with the letter of the rule, hence the ESF route is retained. At this stage, EASA is not in a position to define acceptable means of compliance, or might risk dictating prescriptive design measures limited to the recent EASA experience.

It shall be noted the ESF route has also be retained in the past for assessing compliance of fan zone against 25.1181, when the applicant wanted to declare it as a FFLZ instead of a DFZ as per the rule.



The Condition consulted is explicitly stating that given example are not exhaustive and does not intend to cover all situations. It shall also be noted that the consulted Condition does not really identify which of the compensating factors are belonging to which of the example described. Finally what is deemed generic to a Bombardier design might not be generic to other applicant's design.

Comment # 2 : General

A concern Bombardier has is that, with a CM, the criteria may evolve over time resulting in interpretation creep, demanding higher standards or more conditions to satisfy the ESF. A generic CM that defines acceptable criteria that precludes the need for an ESF is desired. An ESF does invoke more certification risk, takes more time to close & demands more activity at a manufacturer in comparison to finding compliance using established standards.

EASA response: Disagreed.

EASA does not share Bombardier opinion that ESF is adding certification risk – the public availability of this ESF is indeed removing potential risk by enhancing applicant awareness of the problematic. EASA believes that the ESF approach is still necessary since the rule is of high level, therefore the identification of compensating factors that is intimately linked to the detailed design (physical engine/nacelle/pylon zone related, sub-rule deviation related) cannot find an equivalency with an AMC/CM material.

Comment # 3 : General

It is noted from CAAM data, that uncontrolled PP fires leading to significant events (CAT, or HAZ beyond the fire itself) demonstrate that past & current practices are improving the rate, which is approaching nil.

EASA response: Partially agreed.

Current nacelles tend to be bigger and more complex (larger diameter resulting from BPR increase). Also, more and more composite materials in nacelle, with backside out-gasing and ignition reinforce the need for robust compliance with 25.1182.

EASA tend to share the Bombardier opinion that CS 25.1181/CS25.1182 rules, including compensating factors when not directly complied to, are providing an adequate level of fire prevention/protection for powerplant installation.

