

DOCUMENT COMMENT LOG

Document Title: #1293-Cessna Aircraft Company

NOTICE OF PROPOSED AMENDMENT (NPA) 2013-02 – "Protection from debris impacts"

Commenter	Page/Paragraph	Comment	Suggested Change
Cessna Aircraft Company	6/V.20. Note 2	To publish guidance relative to small engine debris within this NPA when the 'Ref 2 activities' pertaining to harmonization with AMC 20-128A have not been completed is not beneficial. Any guidance issued in this area by this NPA is premature and does not provide the broader and more coherent guidance needed by the users of this NPA and AMC 20-128A.	Provide a broader and more coherent guidance relative to fuel tank threats and protection from small engine debris within a revision to AMC 20-128A.
Cessna Aircraft Company	6/V.20. Scope	The guidance of this NPA regarding small engine debris appears to directly crossover into the realm covered by CS 25.903(d), and the associated guidance in AMC 20-128A. In that regard it is not clear how the overlapping guidance between this NPA and that of AMC 20-128A is to be handled. Any discussion of small engine debris or small fragment analysis guidance would be better suited in AMC 20-128A by revision in order to have a cohesive document addressing rotor non-containment and the ensuing analysis.	Provide a broader and more coherent guidance relative to fuel tank threats and protection from small engine debris within a revision to AMC 20-128A.
Cessna Aircraft Company	7/V.21. Background	It is not clear if the small fragment data per AMC 20-128A is to be used when it is available.	Provide clarification
Cessna Aircraft Company	60/ AMC 25.963(e), 3.a.	There is no background rationale at how the fuel leakage criteria was developed. It appears to be arbitrarily determined and not necessarily associated with creating hazardous fuel leakage environment that could lead to an incident.	Provide explanation in background
Cessna Aircraft Company	61/ AMC 25.963(e), 3.b. Note 1	It is not clear why AMC 20-128A guidance pertaining to small debris is applicable for minimization of the RNC threat for CS 25.903(d) for other system & structure areas but not for the fuel tank.	Provide explanation in background
Cessna Aircraft Company	61/ AMC 25.963(e), 3.C.(1).	The background does not provide a rationale how these defined leaks particularly a 6" wetted area constitutes a hazardous fuel leak. Considering the nature of an uncontained event, more severe hazards to the airplane caused by a fuel tank leak are being evaluated under CS 25.903(d).	Provide explanation in background
Cessna Aircraft Company	61/ AMC 25.963(e), 3.C.(2).	The extent of the area beyond the ± 15 degrees area is not defined. Similarly there is no discussion of the relevance of alpha and beta angles in Figure 1.	Provide explanation in background
Cessna Aircraft Company	62/ AMC 25.963(e), 3.D.	Oblique angles may exist within the 15 degree area as well as outside of it. For aft mounted engines there is not a normal impact (90 deg).	Provide explanation in background
Cessna Aircraft Company	Page 37; 38B	Adequate pass/fail criteria is not provided for the FOD and Skid-Through tests for the ETSO/TSO requirements.	Recommend removing the FOD and Skid-Through tests from the ETSO/TSO requirements.

Commenter	Page/Paragraph	Comment	Suggested Change
Cessna Aircraft Company	Page 37; 38B		Recommend adding a tire overspeed test per ARP 5257 to the ETSO/TSO
Cessna Aircraft Company	Page 48; CS 25.734 Protection against wheel and tyre failures	The term “damaging” is open to a wide range of interpretations. Replacing with “hazardous” seems to be more in-line with the intent of the proposed rule.	Recommend revising the proposed CS 25.734 from “the aeroplane must be protected from the damaging effects of:” to “the aeroplane must be protected from the hazardous effects of:”
Cessna Aircraft Company	AMC 25.963(e), Section 3.C.(1)	• This guidance is directed at wing mounted engines, as demonstrated from Figure 1 in AMC 25.963. For a Fuselage Mounted Engine, such a condition would be impossible. • Page 9 of NPA 2013-2 states: <i>“Also note that the wing mounted engine debris trajectory distribution is oriented towards the aft of the engine disk plane, partly due to drag, relative velocity with respect to the aircraft, and aircraft configuration. (See Figures 1(a) and (b) below, and Ref. 1 A-5.)”</i> ○ The drag and relative velocity of any engine fragment from a fuselage mounted engine with respect to the aircraft will further reduce the likelihood of this fragment impacting the wing and potentially spilling fuel. • Page 20 of NPA 2013-2 says: <i>“Indeed, it is recognized that the wing skin surrounding fuel tank access covers is designed to carry main wing loads and therefore this typically drives its impact resistance capability beyond the level required to resist the 3/8 inch cube threat.”</i> ○ This is not the case for a fuselage mounted engine, as the fragment would impact very far outboard where external loads are low, and at the upper surface of the skin, where the skins are designed much thinner as they are not efficient in resisting compressive stresses due to bending of the wing.	Recommend that the wording in AMC 25.963(e), Section 3.c.(1) be amended to include the statement that “For aircraft with fuselage mounted engines, credit will be allowed for impact incidence angle, drag, and relative velocity of the engine fragment”
Cessna Aircraft Company	Page 14 of NPA 2013-2	<i>“This semi-empirical assessment was based upon the two following formulas. Those formulas have been established from available low and high speed impact tests performed in the frame of recent aircraft certification projects.”</i> There are no references or formulas listed demonstrating how they backed out the energy of the fragments and the ability of aluminum sheet to resist this energy.	Recommend providing citations and references on energy absorption formulas to provide further guidance to the design.
Cessna Aircraft Company	AMC 25.734	The requirement of a 60° arc segment of wheel flange debris at 100 m/s is excessive and could severely penalize the efficiency of a particular wing design, and creating unacceptable costs and penalties to the design. There is very little data to support these assumptions and NPA 2031-02 admits to such.	Recommend eliminating Model 4 – “Wheel Flange Debris Threat Model” from AMC 25.734