

AC 25.729-1 TRANSPORT AIRPLANE LANDING GEAR RETRACTING MECHANISM

Public Comment Log with Dispositions 6-6-2011

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| Comment | Requested Change | Disposition |
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| Commenter and paragraph number: | | |
| Henrique Felcar/ANAC Paragraph 3.a "Related Federal Aviation Regulations": The inclusion of the Section 25.777 Cockpit Controls in the references is a suggestion, due to its Landing Gear Control subparagraph (f); | 3. Related Documents a. Related Federal Aviation Regulations (...) Section 25.777 Cockpit Controls (...) | The FAA concurs. Section 25.777 will be added to the "Related Federal Aviation Regulations. |
| Boeing/Page 2, Para 3B | FAA Advisory Circular No. AC 25.1322-1, "Flightcrew Alerting," should be included in the list of related Advisory Circulars. AC 25.1322-1 provides extensive guidance on flightcrew alerting for many systems, including landing gear actuation. | The FAA concurs. AC 25.1322-1 has been added to the list of related Advisory Circulars. |
| Henrique Felcar/ANAC Paragraph 3.b "FAA Advisory Circulars": The FAA AC-25.729-1 refers to an acceptable means for showing compliance with the requirements of the Title 14 of the Code of Federal Regulations (14 CFR) | Please clarify the inclusion purpose of the AC 23-17B reference; | AC 23-17B is included as relevant advisory information, albeit for part 23 airplanes, but useful for part 25 airplanes as well (currently no such information is published for transport airplanes). Section 23.729(g) of the AC discusses means of |

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| 25.729. Being so, it is not clear the inclusion purpose of the AC 23-17B reference, apart of the 14 CFR Part 25 context. | | compliance to issues such as “tire burst, and structural portions of the gear that are considered part of the landing gear. Advisory information for part 25 airplanes is being developed under EASA Task 25.028, Wheel & Tire Failure Model. |
| In addition, it is suggested to include the AC 21-16F “RTCA Document DO-160 versions D, E, and F, ‘Environmental Conditions and Test Procedures for Airborne Equipment’ for landing gear components qualification; | 3. Related Documents (...) b. FAA Advisory Circulars (...) AC 21-16F RTCA Document DO-160 versions D, E, and F, "Environmental Conditions and Test Procedures for Airborne Equipment (...) | The FAA concurs. AC 21-16F has been added to the list of FAA Advisory Circulars. |
| Henrique Felcar/ANAC Paragraph 3.e “RTCA Documents”: It is recommended the inclusion of the latest RTCA Documents references; for instance, the RTCA/DO-160F is out of date, superseded by the RTCA/DO-160G from 12/08/2010. | 3. Related Documents (...) e. RTCA Documents (...) RTCA/DO-160G Environmental Conditions and Test Procedures for Airborne Equipment, issued December 8, 2010(...) | The FAA does not concur. AC 21-16F, dated 11/19/2009 does not include RTCA/DO-160G dated 12/8/2010 in Appendix 1, “Summary of Changes between DO-160D, E, and F. When AC 21-16 is updated to include DO-160G, we will accept it as a means of compliance. In the meantime, applicants may propose DO-160G as a means of compliance to the |

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| | | aircraft certification office on a project specific basis. |
| Boeing/Page 5, Para 4 | We suggest adding a standard wheel and tire threat definition. In addition to guidance on warning indication for landing gear actuation systems, we recommend including harmonized technical guidance on how to address threats resulting from flailing or bursting tires along with wheel failures; especially given that the failure models in the existing EASA TGM/25/08 Issue 2, "Wheel and Tyre Failure Model." have not been incorporated in AMC 25.729 and the FAA does not have guidance in this area. Industry/FAA/EASA/TCCA activity associated with EASA Terms of Reference (ToR) for Task 25.028, "Protection from debris impacts," is currently attempting to develop/revise wheel and tire threat models and information that not only apply to systems and equipment, but to airplane structure. | The FAA does not concur. Although the Industry/FAA/EASA/TCCA team is currently developing a wheel and tire threat model, it is not ready and the team is still deliberating. Even when completed the codification of such a standard model and associated guidance would be outside the scope of current rulemaking, and will be addressed as separate rule-making. |

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| | <p>Given the lack of wheel/tire threat guidance in the Draft AC 25.729-1 relative to §25.729(f), the existence of EASA TGM/25/08 Issue 2, and the current activity associated with ToR 25.028, we recommend that Draft AC 25.729-1 be revised to include the wheel and tire threat definitions resulting from the ToR 25.028 effort.</p> <p>A standard wheel and tire threat definition is justified to ensure that all manufacturers are designing to a common certification standard that adequately represents the wheel and tire threats.</p> | |
| <p>Boeing/Page 5, Paragraph 4 <i>“For definitions V_S, V_{SI}, and V_C, see 14 CFR 1.2, Abbreviations and symbols.”</i></p> | <p>Replace V_S and V_{SI} with V_{SR} and V_{SRI}, respectively.</p> <p>The proposed change to 14 CFR § 25.729 changes the terminology and, thus, the AC must agree with it.</p> | <p>The FAA concurs. The correct V speeds have been incorporated into the AC.</p> |
| <p>Embraer/ Page 7, Paragraph 6D(1) The NPRM, as well as the draft advisory circular proposed by the ARAC Mechanical Systems Harmonization</p> | <p>To ensure the intended level of safety and to harmonize with the existing EASA standards Embraer suggests changing this sentence to match that in the</p> | <p>Reference should be to paragraph (6)d.(1). The FAA concurs. The word “typically” has been deleted.</p> |

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| <p>Working Group, does not accept design provisions to prevent tire burst as a justification to not provide for protection against the effects of tire burst. "The use of fusible plugs in the wheels is <i>not typically</i> a complete safeguard against damage due to tire explosion." (emphasis added) would appear to leave open the possibility to use the protection provided by fuse plugs as a justification to not protect against the effects of tire burst.</p> | <p>ARAC recommendation to say "The use of fusible plugs in the wheels is not a complete safeguard against damage due to tire explosion."</p> | |
| <p>Boeing/Page 7, Paragraph 6D(1) The proposed text states: <i>"(1) The use of fusible plugs in the wheels is not typically a complete safeguard against damage due to tire explosion."</i></p> | <p>We recommend that the text be revised to read as follows: <i>"(1) The use of fusible plugs in the wheels is not typically a complete safeguard against damage due to <u>a bursting</u> tire explosion."</i></p> <p>The word "explosion" means a rapid conversion of energy due to a chemical reaction. Tire "explosion" has adequately been addressed by §25.733(e) (at Amdt. 25-78), where tires are now required to be <i>"inflated with dry nitrogen or other gases</i></p> | <p>Reference should be to paragraph (6)d.(1). The FAA concurs. The term "tire explosion" has been replaced by the term "a bursting tire" in the AC.</p> |

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| | <i>shown to be inert so that the gas mixture in the tire does not contain oxygen in excess of 5 percent by volume.</i> | |
| <p>Boeing/Page 7, Paragraph 6D(2) The proposed text states: <i>“(2) Where brake overheating could be damaging to the structure or equipment in the wheel wells, an indication of brake temperature should be provided to warn the pilot.”</i></p> | <p>We recommend that the text be revised to read as follows: <i>“(2) Where brake overheating could be damaging to the structure or equipment in the wheel wells, it is recommended that an indication of brake temperature should be provided to warn the pilot.”</i></p> <p>§25.729(f) is an FAA regulation that has historically been applied only to systems and equipment and not airplane wheel well structure. Inclusion of the word "structure" appears to be an escalation in certification requirements via this advisory material. This is also supported by the heading text for the existing §25.729(f), which is <i>"Protection of equipment in wheel wells,"</i> and the proposed new wording for §25.729(f), <i>"Protection of equipment on landing gear and in wheel wells,"</i> which does not include the word "structure."</p> | <p>Reference should be to paragraph (6)d.(2). The FAA partially concurs. The word “should” as used in the AC is standard and will not be changed. However, the reference to “structure” has been removed. It is noted that CS/CFR 25.735(j) does require means be provided in each braked wheel to prevent a wheel failure, a tire burst or both that may result form elevated brake temperatures. Such a system may also afford protection for structure that is vulnerable to elevated temperatures. Additionally, 14 CFR 25.571 requires that structure be evaluated at the typical loading spectra, temperatures and humidities expected in service. Therefore, structure should be evaluated for those cases of high temperature brakes, as high temperature brakes are a probable event.</p> |

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| | <p>The text, "<i>an indication of brake temperature should be provided to warn the pilot,</i>" also appears to be an escalation in certification requirements via this advisory material, since the implication is that an indication of brake temperature MUST be provided to warn the pilot. There is extensive favorable service experience with quick-turn transport category airplanes, (such as Boeing 737 model series) having equipment in very close proximity to the brakes, which do not have an indication of brake temperature. Brake temperature indication is only one potential means to provide thermal protection. Other methods include providing recommended brake cooling times in the aircraft operations manuals to ensure that overheated brakes are not retracted into the wheel well. It may also be preferable to provide heat shielding as the primary protection against damage from brake overheating.</p> | |