

The FAA Aircraft Certification Offices (ACO's) and Flight Standards District Offices (FSDO's) that certify changes in type design and approve alterations in normal, utility, and acrobatic category airplanes should try to follow this policy when appropriate. In addition, as with all advisory material, this statement of policy identifies one means, but not the only means, of compliance.

Because this proposed general statement of policy only announces what the FAA seeks to establish as policy, the FAA considers it an issue for which public comment is appropriate. Therefore, the FAA requests comments on the following proposed general statement of policy relevant to compliance with § 23.251 of the Federal Aviation Regulations (14 CFR 23.251), and other related regulations.

### Summary

Section 23.251 must be addressed when approving replacement propellers. While flight testing to V-dive may not be required to show compliance for slow, low performance airplanes, it is normally necessary for higher-performance airplanes because they are more likely to inadvertently exceed their maximum speed.

### Background

We recently received a large number of supplemental type certification (STC) applications for replacement propeller installations on single engine airplanes with a reciprocating engine. The propellers are type certificated under 14 CFR part 21, § 21.29 (accepted under the bilateral agreement with the exporting country). The applicant questioned whether the airplanes modified with these propellers should be required to fly to dive speed under part 23, § 23.251 as part of the STC program in addition to showing compliance to § 23.33 for propeller overspeed.

Propeller overspeeds can occur during high-speed flight, such as the dive test. Overspeeding refers to a condition where the engine or propeller RPM limit is exceeded; typically because the airplane is going fast enough to drive the propeller (and engine) beyond the engine limits. The intent of § 23.33 is to ensure that propeller overspeeds did not occur within the normal flight envelope. This intent differs from that in the V-Dive requirements, § 23.251, which were intended to address airframe vibration and buffeting. The intent of these requirements are supported by the Flight Test Report Guides for both CAR 3 and early part 23 (FAA Form 8110-11 and 8110-18) which had an allowance for the use of a different

propeller for the dive test if the production propeller would overspeed the engine beyond that allowed by the engine manufacturer. This practice of allowing different propellers supports that the original intent of § 23.251 was not an engine/propeller control test, but an airframe test addressing vibration and buffeting.

Service history for light, low-speed (typically 2-4 place) reciprocating engine powered airplanes has validated the testing limits used for both the § 23.33 and § 23.251 requirements. This airplane class is typically slow enough that it is unlikely the pilot would inadvertently exceed  $V_{NE}$ . Furthermore, in most cases, at dive speed, the air is driving the propeller and there are not any pressure pulses from the propeller to affect the airframe. The other concern is the propeller overspeeding the engine. Finally, the frequency of the propeller and engine RPM are typically far from any airframe harmonic frequency.

Propellers on multiengine and turboprop airplane installations are more critical than on light, low-speed airplanes and applicants should consider including a dive test for these certification programs. Previous dive tests on a turbine powered, multiengine airplane uncovered a problem with the engine/propeller control system. While § 23.251 is not intended to address propeller or engine control problems directly, this problem was severe enough to warrant a design change because of safety considerations. In addition, it is typically easier and therefore more likely that the pilot of a larger, multiengine airplane or turbine powered airplane will inadvertently exceed  $V_{NE}$  or  $V_{MO}$  in normal operation. Additionally, there have been propeller/turbine engine runaways caused by over-speeding during the V-dive test. Performing the V-dive test for the propeller installation program would insure that a propeller/engine problem is not discovered inadvertently during follow-on non-propulsion based airplane modifications requiring test pilots to demonstrate the airplane out to V-dive.

### Policy

Part 23, § 23.251 requires that the aircraft be free of vibration and buffeting that could interfere with the pilot's ability to safely fly the aircraft, at all speeds up to  $V_D$ , in all approved airplane configurations. Compliance with § 23.251 is typically shown with a flight demonstrating that all design analysis and margins related to airframe vibration and buffeting, including those established for the propeller/engine/

airframe, are adequate to provide a safe airplane up to its dive speed.

Section 23.251 must be addressed when approving replacement propellers. While dive testing the airplane is one way to demonstrate compliance to § 23.251, it may not be necessary for light, low-speed airplanes that are unlikely to inadvertently exceed the maximum speed of the airplane. Conversely, dive testing should be performed for higher-performance airplanes because they are more likely to inadvertently exceed their maximum speed.

For light, low-speed airplanes, should the applicant choose not to perform a dive test, then other means of compliance acceptable to the FAA must be provided. One way of addressing § 23.251 is for an applicant to provide evidence of positive service history or that the new propeller/engine combination has been tested on a previous program to the same or a higher speed being requested. Applicants have also shown compliance with § 23.251 by analysis and by limiting  $V_D$  to a lower value such as  $V_{NE}$ .  $V_{NE}$  now becomes the new  $V_D$ , and a new  $V_{NE}$  is established at a lower speed.

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**Marvin R. Nuss,**

*Acting Manager, Small Airplane Directorate, Aircraft Certification Service.*

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## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

#### **Proposed [Preliminary] Airworthiness Criteria for Airworthiness Certification of Transport Category Airships**

**AGENCY:** Federal Aviation Administration, DOT.

**ACTION:** Extension of comment period.

**SUMMARY:** This notice announces the extension of the comment period for the notice of availability and request for comments for the initiation of a Federal Aviation Administration (FAA) proposed airworthiness criteria for transport category airships. The FAA is extending the comment period to allow companies and individuals adequate time to complete their comments to the proposed criteria.

**DATES:** The comment period is being extended from February 5, 2002, to April 5, 2002.

**ADDRESSES:** Copies of the proposed airworthiness criteria for transport

category airships may be requested from the following: Small Airplane Directorate, Standards Office (ACE-110), Aircraft Certification Service, Federal Aviation Administration, 901 Locust Street, Room 301, Kansas City, MO 64106. The proposed airworthiness criteria is available on the Internet at the following address: [http://www.faa.gov/programs\\_rsvp2/smart/faq\\_home\\_page/certification/aircraft/small\\_airplane\\_directorate\\_news\\_proposed.html](http://www.faa.gov/programs_rsvp2/smart/faq_home_page/certification/aircraft/small_airplane_directorate_news_proposed.html).

Send all comments on the proposed airworthiness criteria for transport category airships to the individual identified under **FOR FURTHER INFORMATION CONTACT**.

**FOR FURTHER INFORMATION CONTACT:**

Mike Reyer or Karl Schletzbaum, Federal Aviation Administration, Small Airplane Directorate, Regulations & Policy, ACE-111, 901 Locust Street, Room 301, Kansas City, Missouri 64106; telephone: (816) 329-4131 (M. Reyer); or (816) 329-4146 (K. Schletzbaum); fax: (816) 329-4090; e-mail: [karl.schletzbaum@faa.gov](mailto:karl.schletzbaum@faa.gov) or [michael.reyer@faa.gov](mailto:michael.reyer@faa.gov).

**SUPPLEMENTARY INFORMATION:** The FAA issued a notice of availability and request for comments on Proposed Airworthiness Criteria for Airworthiness Certification of Transport Category Airships on September 28, 2001 (66 FR 51090, October 5, 2001). The FAA is extending the comment period to give all interested persons the opportunity to comment on the proposed criteria.

Issued in Kansas City, Missouri on January 23, 2002.

**Michael K. Dahl,**

*Acting Manager, Small Airplane Directorate, Aircraft Certification Service.*

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## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

#### Policy Statement Number ANM-01-04; System Wiring Policy for Certification of Part 25 Airplanes

**AGENCY:** Federal Aviation Administration, DOT.

**ACTION:** Notice of final policy.

**SUMMARY:** In this document, the FAA addresses public comments that were submitted in response to a previously published general statement of policy that is applicable to the type certification process of transport category airplanes. The policy provides guidance to FAA certification teams for the type design data needed. The policy

is necessary to correct deficiencies associated with the submittal of design data and instructions for continued airworthiness involving airplane system wiring for type design, amended design, and supplemental design changes.

**FOR FURTHER INFORMATION CONTACT:**

Gregory Dunn, Federal Aviation Administration, Transport Airplane Directorate, Transport Standards Staff, Airplane and Flight Crew Interface Branch, ANM-111, 1601 Lind Avenue SW., Renton, WA 98055-4056; telephone (425) 227-2799; fax (425) 227-1320; e-mail: [gregory.dunn@faa.gov](mailto:gregory.dunn@faa.gov).

**SUPPLEMENTARY INFORMATION:**

#### Background

On July 2, 2001, the FAA published in the **Federal Register** (66 FR 34983) a general statement of policy comprising guidance to FAA personnel for reviewing certain certification plans for transport category airplanes. Specifically, the policy statement provides internal guidance to FAA certification teams that will enable them to more thoroughly examine all required information submitted in the type design data package for compliance with wire installation safety standards. This policy will also advise applicants what information needs to be provided in their type design data package to avoid delays in the certification process caused by incomplete or ambiguous information.

The safety standards for civil transport category airplanes are specified in Title 14, Code of Federal Regulations (CFR), part 25. If an applicant demonstrates that a particular design (*i.e.*, a particular model) complies with these standards, the FAA issues it a design approval. The drawings and other data that describe that design are known as the "type design." When an applicant submits the necessary documents required for type certification by the FAA, the compilation of those documents is known as the "type design data package."

Based on certification projects submitted to the FAA for review in recent years, the FAA has become aware that there is some confusion among applicants as to the definition of "type design," especially with respect to the inclusion of drawings and specifications necessary to define the wiring configuration associated with equipment installation. In a number of recent certification projects, type design data packages that were submitted did not include wiring diagrams showing the source and destination of all wire

associated with the installation. Also, wire installation drawings showing airplane wire routing, grounding, shielding, clamping, conduits, etc., either were missing or lacked sufficient detail. The wiring diagrams and installation drawings did not contain the necessary information intended by the relevant regulations. These drawing packages did not adequately and clearly define the configuration of the model to be certificated. In addition, instructions for continued airworthiness, as required by the regulations, were not defined.

#### Current Regulatory Requirements

The type and quality of data required for type design data packages and requirements for instructions for continuing airworthiness are indicated in the regulations. The pertinent sections of 14 CFR are as follows:

**Section (§) 21.31** ("Type design"): This section defines and describes "type design."

**§ 21.33** ("Inspection and tests"): This section, specifically § 21.33(b), provides additional insight as to the contents of the type design data package.

**§ 21.21** ("Issue of type certificate: normal, utility, acrobatic, commuter, and transport category aircraft; manned free balloons, special classes of aircraft, aircraft engines; propellers"): This section lists pertinent requirements for a type certificate.

**§ 21.50** ("Instructions for continued airworthiness and manufacturer's maintenance manuals having airworthiness limitations sections"): This section requires applicants to submit instructions for continued airworthiness as part of their type design data package. Paragraph 21.50(b) is relevant to this policy statement.

**§ 21.101** ("Designation of applicable regulations") and **§ 21.115** ("Applicable requirements"): These sections make it clear that these data requirements apply to changes to type certificates.

Procedures for accomplishing the evaluation and approval of airplane type design data can be found in FAA Order 8110.4B, "Type Certification," dated April 24, 2000. This document gives comprehensive guidance on what constitutes a design package and what is necessary to make acceptable findings of compliance.

#### Identified Problems

##### *Ambiguous Definition of Configuration*

As mentioned above, the FAA has identified a number of recently submitted type design data packages that did not meet the intent of § 21.31(a). Specifically, these packages did not completely define the