

does the Boeing 777 ETOPS Special Condition, which is the basis for this proposed requirement. The relevant experience assessment that Boeing submitted for compliance with the Special Condition's requirement consisted of data from a ten year time period immediately prior to the B777 design development. The FAA approved this ten-year period at the time because it included three previous major airplane certification programs (Models 757, 767, and 737-300). For the current Model 777-300ER type certification program, the assessment was updated to include the additional relevant experience that has occurred since the original database was developed. Coincidentally, this covers a ten-year time period. However, the FAA cannot draw a conclusion from this experience that a ten-year period will always provide adequate data for all manufacturers that may apply for an early ETOPS approval. Therefore, the FAA has included a provision that the 10-year limit applies if adequate data exists to do the assessment. If the FAA determines that the applicant's other relevant type design approvals provided within the past ten years do not constitute an adequate database, the FAA will determine the extent of additional data required to be included in the relevant experience assessment based on the following factors:

- a. The manufacturer's level of experience in certifying engines installed on Transport Category airplanes,
- b. Recent experience certifying new engines,
- c. Completeness of the manufacturer's design practices/manuals used in the development of new engines, and
- d. Any other factors that the manufacturer may want to present to the FAA for consideration.

### 3. Insertion of the Word "Independently" in the Test Section of Section 33.200(c)(2)

The ARAC Recommendation 3,000 cycle test requires all rotors to be unbalanced to 90% of a limit value, however the actual rule text is not specific as to whether each rotor is to be unbalanced independently. The FAA has verified that it was the ARAC's intent that each rotor must be unbalanced independently relative to its individual rotor limit. So the word "independently" is inserted to clarify that each individual rotor must be unbalanced to the specified 90% limit value.

### 4. Addition of Inspection Criteria for Post 3,000 Test [See 33.200(e)(3)(i)(C)]

The ARAC Recommendations specify hardware layout inspections in accordance with the Instructions for Continued Airworthiness (ICA) and the Lessons Learned analysis. The FAA proposes to add a third inspection criteria as follows: "Inspect in a manner to identify wear or distress conditions which could result in IFSD, LOTC or other power loss, and which are not specifically identified by 33.200(b) or addressed within the current ICA." It should be noted that the ARAC Recommendation's AC material discusses such an inspection method and that the recent FAA B777 Special Condition for ETOPS also included a similar inspection requirement.

### 5. Clarification of an Incomplete Statement Relating to Post-Test Hardware Condition [See § 33.200(e)(3)(ii)]

The ARAC Recommendation contains a requirement that post-test hardware condition be such that no distress is observed that could result in a power loss. However many engine parts if distressed and operated long enough will fail and potentially cause a power loss. As written, distress in many parts could be predicted to result in power loss over an inappropriately long period of operation. Therefore the FAA proposes to define the period of operation to make this judgment as follows; "\* \* \* within a period of operation before the component, assembly or system would likely have been inspected or functionally tested for integrity while in service".

### 6. Revision of Interim Inspection To Be Used for § 33.90 Compliance

The ARAC Recommendations propose to use the 3,000-cycle test for § 33.90 compliance by means of an interim on-wing inspection method. The FAA concurs with the basic on-wing inspection approach. However, the ARAC Recommendations only specify a visual inspection for § 33.90 compliance purposes. This Recommendation does not meet the most basic existing Method of Compliance (MoC) for a § 33.90 inspection. The FAA proposes to revise the "visual only" inspection to be an inspection acceptable to the Administrator, and specify an acceptable MoC within the AC. Currently for an on-wing type inspection for § 33.90 compliance, the FAA would accept an inspection that does all of the following:

- (1) Full borescope inspection of accessible gas path stages or areas of the

fan, compressor, combustor, and turbine modules, to the serviceable limits of the ICA.

- (2) For Full Authority Digital Electronic Control (FADEC) equipped engines, observe and interrogate the FADEC system for fault messages and status messages, both current or previously recorded, to the serviceable limits of the ICA.

- (3) Inspect all oil system chip detectors and filters for contamination.

- (4) Inspect all fuel system filters for contamination.

- (5) Test a sample of main engine oil for contaminants that might indicate impending internal failure.

- (6) Conduct a complete visual inspection of the inlet, exhaust, and externals, to the serviceable limits of the ICA.

- (7) Conduct a power calibration to show that the engine can produce power or thrust within established limits, and is free of surge or stall when operated in accordance with the Operating Instructions.

General pass/fail criteria for the above items is serviceable in accordance with the ICA, unless otherwise approved by the Administrator.

The above method of compliance has been established for conventionally designed engines, and is discussed further in the companion AC. Other inspections or checks, or deletion of non-applicable items may be necessary for new or unconventional designs.

### 7. Addition of Oil Tank Design Requirement

The FAA is proposing to revise the current requirements of § 33.71(c)(4), which addresses oil tank caps. The proposed revision would incorporate a new ETOPS eligibility design requirement for oil tanks intended to prevent hazardous oil loss in the event of an oil tank cap installation error. The FAA is aware of a number of single and dual engine oil loss events due to oil tank cap installation errors, and is concerned that these types of problems will continue to occur, potentially resulting in an unsafe condition during extended operations. The FAA believes it prudent to address this situation by requiring oil tanks to be designed to accommodate cap installation errors without hazardous oil loss. The proposed rule would not allow compliance by maintenance procedures; the necessary physical features or characteristics must be part of the oil tank design. The rule is intended to protect against hazardous oil loss when oil tank cap installation errors occur.