



Summary of Public Submissions Received on

**AC91-16 — Normally Aspirated Piston Engine TBO
Escalation Procedure**

**Prepared by John Bushell
Airworthiness Coordinator**

21 July 2010

Table of Contents

General	1
Summary of Submissions	1
Subject area	1
1. Including Private Operations.	1
2. Sole Overhaul Facility.....	2
3. Oil Analysis:.....	2
4. Normally Aspirated Engines.	3
5. 75% TBO Exhibit Engines.	3
6. Small Operator Escalation.....	3
7. Bulk Strip of Exhibition Engine.	3
8. Definition of Hire and Reward.....	4
Appendix A – List of Submitters	5
• MacKenzie Aviation Ltd,.....	5
• Super Air Ltd,.....	5
• Massey University School of Aviation	5

General

A draft of the Advisory Circular AC91-16 was published on 26 April 2010 for public consultation on the CAA website, with submissions close-off on 30 June 2010. CAA notified all appropriately registered aviation clients of the draft Advisory Circular publication to the website for consultation on 26 April 2010.

The purpose of the public consultation was to receive feedback on the draft Advisory Circular.

Summary of Submissions

Submissions were received from certificated and non-certificated aviation organisations and individuals.

A total of 18 submissions were received during the 8 week period.

Of these 12 were from certificated and non-certificated aviation organisations, 4 from individuals and 2 from CAA staff. Refer to Appendix A for a list of submitters.

The submissions generally fell into 8 areas:

1. Concern that the AC included private operations
2. Concern that the AC required the operator to nominate a sole engine overhaul facility
3. Use of oil analysis
4. Only included normally aspirated engines
5. 75% of manufacturer's TBO remaining for an exhibit engine.
6. How a small operator can escalate their engines
7. An exhibit engine bulk-strip negating the qualification as an exhibit engine
8. Lack of a definition of Hire or Reward

Subject area

1. Including Private Operations.

A number submissions were received in respect that the AC was not clear in that it does not include private operations or, it could be perceived by CAA that private operations are required to comply with this AC.

CAA Response

Revisions to Part 43 and 91 on March 2007 required all operators to comply with manufacturer's recommended overhaul intervals. (91.603(c)). However, 91.603 (d) allows an operator to operate Products and Components beyond the manufacturer's TBO provided the operator complies with a TBO escalation procedure approved under Part 119

(air operations) or approved under 91.607 (approval of maintenance programmes). This AC specifically focuses on operators of Part 119 air operations and all other operators that are not private operators. 91.603(d) specifically relates to products and components. Part 1 defines a Product: an aircraft, aircraft engine or propeller. This means that 91.603(d) enables an operator of an aircraft, aircraft engine (turbine or piston), propeller or a component, to develop a TBO escalation programme for a specific product or component.

91.603(e) allows operators of piston engines not used on hire or reward operations (private operators) to operate beyond the manufacturer's TBO if the piston engine is maintained in accordance with a TBO escalation programme (AC43-5) acceptable to the Director. This is specific to piston engines only used in private operations.

If a private operator wanted to escalate the TBO period of (say) a propeller, they would be required to develop a maintenance programme under 91.607 (template available) and include in that programme the procedures to be carried out to increase the propeller TBO period. This would not affect the TBO period of the engine as the engine could continue to be maintained in accordance with a TBO escalation procedure acceptable to the Director. However, this would need to be stated in the approved maintenance programme under 91.607.

Due to the number of submissions received with concerns that it is not clear private operations are not included as part of this AC, then a paragraph will be inserted to make it clear that private operators are not required to escalate their engines in accordance with this AC.

2. Sole Overhaul Facility.

A number of submissions questioned the requirement to nominate a sole Part 145 engine overhaul facility and what if the operator elected to use manufacturer factory exchange engines.

CAA Response:

CAA considered that by nominating an engine overhaul facility a consistent engine strip report would allow for easily comparable operator strip reports and build standards. However, CAA is prepared to reconsider this requirement given the high standard of engine overhaul facilities in New Zealand and that a number of operators using factory exchange engines.

3. Oil Analysis:

There were a number of passionate submissions for and against the requirement for oil analysis.

CAA Response:

The use of spectrometric oil analysis is a relatively new tool in the General Aviation piston engine maintenance and is not carried out by all operators. Also it is not a mandatory requirement by the major general aviation engine manufacturers. CAA is prepared to reconsider the mandatory use of spectrometric oil analysis for operators developing an engine escalation programme.

4. Normally Aspirated Engines.

A number of submissions questioned why only normally aspirated engines could be escalated in accordance with a piston engine escalation programme.

CAA Response:

Most engines in the New Zealand general aviation fleet are normally aspirated in the lower power range; with turbo charged engines fitted to the higher performance, high powered light twin aircraft. The CAA considered that a meaningful TBO escalation programme could not be achieved for the turbo charged engines, however the CAA is prepared to accept further submissions from industry engine professionals on whether turbo charged engines be included in an engine escalation programme.

5. 75% TBO Exhibit Engines.

It was considered by a number of submitters that an exhibit engine requiring 75% of the manufacturer's recommended TBO remaining before it could be considered for an exhibit engine, was too high. Most submitters thought that 30% of the remaining manufacturer's TBO, was sufficient time for an operator to elect an engine as an exhibit engine and would assist in reducing the time taken to achieve an approved operator escalated TBO.

CAA Response:

CAA agree that 75% is too high, but consider 30% too low. CAA is prepared to discuss this with engine overhaul professionals to achieve a suitable outcome.

6. Small Operator Escalation.

A number of submissions questioned how a small fleet or low utilisation operator could escalate their engines in 10% steps and the time taken to achieve a significant extended operator TBO.

CAA Response:

The CAA agrees that for small fleet or low utilisation operators it would take a significant time to achieve a useful extended operator TBO. However, any TBO escalation programme or extended operator TBO is limited by the engine manufacturer calendar TBO period. Typically the manufacturer TBO is 2000 hours or 12 years. For an operator to use the 2000 hours, they must operate the aircraft for an average minimum of 167 hours per annum for each of the 12 years. That is $2000 \text{ hours} \div 12 \text{ years} = 167 \text{ hours per annum}$. If an operator is not achieving this utilisation then they are required to overhaul at the manufacturer's recommended TBO. The CAA will accept an engine bulk strip at the expiry of the calendar TBO to reset the calendar period to zero, but hours to run to overhaul must continue. An operator with one single engine aircraft having a utilisation higher than 167 hours per annum then an escalation may be viable. For operators of engines where the manufacturer does not list a calendar TBO period, then the operator may escalate their engine in TBO hours without the limitation of a calendar TBO. In this situation the CAA would require a robust procedure that would ensure the continued safe operation of the engine.

7. Bulk Strip of Exhibition Engine.

A number of submissions queried why the bulk-strip of an exhibit engine negated that engine as an exhibit engine.

CAA Response:

In nominating an engine as an exhibit engine; it must comply to the approved build standard and be operated as "normally" as possible so that an accurate and meaningful report on the condition of the engine at strip down for overhaul can be achieved. Results of the engine strip down, detailed in the strip report will determine whether the engine can be approved for the next 10% step of the engine TBO escalation. If the exhibit engine is bulk stripped at any time within the overhaul period of the engine; this will not give an accurate indication of the actual time expired condition of the engine at strip down. The CAA will not change this requirement for the reasons stated.

8. Definition of Hire and Reward.

A large number of submissions asked that there be a definition of: *not used for Hire and Reward operations* in the context of 91.603(e).

CAA Response:

It is clear there is an industry requirement for a clear definition of:not used for Hire and reward operations.....

However, as stated elsewhere this AC relates to 119 air operators and operators other than private operators. The rule 91.603(d) to which this AC relates has no reference to Hire and reward operators. This requirement needs to be part of AC43-5 that relates to 91.603(e) for the escalation of piston engines not used for Hire or Reward.

Appendix A – List of Submitters

- MacKenzie Aviation Ltd,
- Super Air Ltd,
- Massey University School of Aviation
- Aviation Teknology (Avtek)
- Sunair
- AOPA
- Performance Aviation Ltd
- Aeromotive
- Aero Support Engineering
- Southern Wings
- Southair Engineering
- AEANZ (AIA Engineering)

- Pat Scotter
- Wally Sturgeon
- Don McInnes
- Ross St George

- Gary Leach – CAA
- Paul Elton - CAA