GAS TURBINE ENGINE PARTS SUBJECT TO RETIREMENT OR ULTIMATE (SCRAP) LIVES

1. The design of gas turbines in service is such that certain critical parts, notably compressor and turbine discs, experience cyclic variation of stress as a result of mechanical and thermal effects which are of sufficient magnitude to result in fatigue damage. The failure of these parts can result in damage to the aircraft since under operating conditions they may possess more energy than can be absorbed by the surrounding engine structure. It is therefore necessary to limit the life of all critical parts in order to prevent fatigue damage developing into complete failure. As fatigue damage is not detectable by current inspection techniques until cracking has begun and because crack propagation to the point of failure can be unacceptably rapid, a safe life of each critical part will have been established and approved as part of the certification procedure.

2. These safe lives, also referred to as retirement lives, ultimate lives, scrap lives and low cycle fatigue (LCF) lives, are mandatory limits which must never be exceeded. They are required by BCAR (A5-3 and B5-3) to be published, in the Engine Manuals, for all engines. Constructors also publish this information variously in Service Bulletins, Service Memoranda, Notices to Operators, Maintenance Manuals, etc., for the benefit of operators and engine overhaul agencies. It may be possible to extend the published lives as a result of further testing, and this is normally indicated in the publications as an aid to spares provisioning, but such amendments must be approved.

3. The DCA requires the inspection and test certificate of an engine issued by a constructor or overhaul agency to include reference to a certified statement in which is recorded the life consumed, up to the time or release, by each of the life limited parts fitted in the engine. This statement is normally included in the engine log book, but may be included in any other document which has been approved as an alternative for a particular operator.

4. Each operator is responsible for ensuring that parts fitted to the engine being operated do not exceed the published lives. Therefore accurate up-to-date records of the life consumed by each engine are required to be maintained and this may involve recording flying hours, number of landings, touch and go landings and takeoffs, air restarts etc. dependent upon each constructor's definition of a unit life. In order to preserve continuity of the records, an up-to-date statement of the life consumed since last release must accompany each engine when dispatched by an operator to an overhaul agency for repair, modification and partial or complete overhaul.

5. When a new type of aircraft is first introduced into service, the operator is responsible for determining a "typical flight cycle", described in engine terms, applicable to its operation. This should be done by sufficient monitoring of service flights and, as necessary, training flights, to provide an adequate knowledge of actual engine flight profiles. If these appear to be in any way more severe than those assumed by the engine constructor, the operator shall inform the engine constructor and DCA. Amended approved lives will be published if necessary.

NOTES:

(1) As differences between winter and summer operation and differences in the installed position of the engines in the aircraft may make significant differences to the usage experienced, these factors should be taken into account in the monitoring programs. Also because auto-throttle and auto-land system can affect the envelope of the engine speeds used, it is important that any changes to the characteristics of such system are assessed.

(2) BCAR (A5-3 and B5-3) requires the engine constructor to publish, in the engine manuals, information concerning the engine flight profile assumed for the establishment of safe lives.

6. Each operator of an aircraft type which he has not previously operated shall, during the first six months of operation, establish that the engines are being used within the flight profile published by the engine constructor. If there is any reason to believe that the flight cycle fatigue usage may be more adverse than currently assumed, the operator shall inform the engine constructor and DCA with a view to revision of the approved lives.

7. Additionally, all operators will be required at yearly intervals to make a formal statement that in respect of engines having been assessed under paragraph 5 of this Notice, there has been no change to their operation, engine handling, auto-throttle systems, thrust reverser drill etc., which could significantly affect fatigue life usage, unless an assessment by the engine constructor has shown any effect to be unimportant or allowed for by appropriate adjustment of lives. This statement should normally form part of the documentary submissions for the renewal of a Certificate of Airworthiness for any aircraft to which
this Notice applies (refer to Notice No.2)

8. **Cancellation**

   This Notice cancels Airworthiness Notice No. 44 Issue 1, dated 1 April 1987, which should be destroyed

DIRECTOR GENERAL
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MALAYSIA.