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## AIRWORTHINESS

### MAINTENANCE

#### **OVERHAUL OF AIRCRAFT PISTON ENGINES - INSTALLED IN AIRCRAFT WITH A MAXIMUM ALL-UP MASS NOT EXCEEDING 5700KG**

##### 1. GENERAL

- 1.1. The overhaul life of an aircraft engine, that is, the number of hours it can safely operate between overhauls, is governed mainly by the type of operation to which it is subjected, the manner in which it is operated, and the maintenance it receives.
- 1.2. The period between mandatory engine overhauls (TBO) shown in Manufacturers Service Publications is based on the assumption that the engine is operated and maintained in accordance with the engine manufacturer's recommendations. Such norms are applicable to all categories of operations, except Category (f) (Private) as defined in NAM-CATS-GMR 43.02.5(1.11) (4).
- 1.3. When assessing the time at which an engine becomes due for overhaul, the engine operating time as shown in the relative logbook must be used.
- 1.4. Where the performance or condition of an engine has deteriorated to such an extent that the engine requires maintenance to restore the engine to a serviceable condition, even though the overhaul hours have not been achieved, it will be the responsibility of the owner to arrange the necessary work with an AMO.
- 1.5. Engines installed in aircraft for which a C of A was issued to operate in Category (f) (Private Operation Category), are exempted from mandatory engine overhauls, and shall be overhauled at such times as are found necessary, save that all Mandatory Service Bulletins and Airworthiness Directives shall be implemented as directed.
- 1.6. Only a Category (D) licensed AMO with the appropriate ratings may assemble, test and certify overhauled engines.
- 1.7. Current logbooks must be handed to the relevant AMO for each engine, which is to be overhauled and the engine must bear an adequate data plate.
- 1.8. If a data plate has been lost, the engine manufacturer's instruction with regard to a valid replacement data plate must be followed. Teledyne Continental Motors S.B. M87-18 Rev. 1

provides an example of such procedures. The Executive Director also be informed of the occurrence.

## 2. OVERHAUL OF ENGINES

- 2.1. When overhauling an aircraft engine the recommendations of the respective manufacturer shall be followed. Organisations undertaking this type of work must therefore be in possession of the appropriate manuals and an up to date set of Service Bulletins and other technical guidance material issued by the Manufacturer or the NCAA. The overhaul of accessories shall be done in accordance with the recommendations of the Manufacturer's.
- 2.2. Prior permission must be obtained from the Executive Director for any deviation from the aforementioned prescription. The person directly responsible for the overhaul and certification of the engine, shall ensure that all parts and components installed on the engine have traceable history and are serviceable in all respects and are of the type approved by the manufacturer concerned.
- 2.3. Accurate measuring equipment is essential if the work is to be done satisfactorily, and to ensure that serviceable equipment is used, proper records shall be kept of all calibrations carried out on the equipment.
- 2.4. Engine manufacturers normally require non-destructive testing (NDT) to parts of their engines, therefore organisations overhauling engines should have NDT equipment available as required by the manufacturers, or should make use of an approved NDT organisation.
- 2.5. It is therefore clear that the overhaul of an aircraft engine or any of its components should not be attempted unless the appropriate manuals and equipment prescribed by the manufacturers are available to enable the overhauling organisations to do the work, in accordance with the prescriptions of the manufacturer.
- 2.6. The detailed record of fits and clearances must be kept in the sequence found in the overhaul manuals.

## 3. TESTING AFTER OVERHAUL

- 3.1. Aircraft engine manufacturers specify the tests which each engine must undergo after overhaul as well as the equipment necessary to do this satisfactorily. Such equipment must be available to each organisation overhauling engines.
- 3.2. Testing of overhauled engines should be done on a suitable test stand using a calibrated test club. Where the overhaul facility does not have a test stand, overhauled engines may be tested in their airframes provided that the manufacturer's procedures for the latter are adhered to. Calibrated instruments, complying with the manufacturers requirements shall be used as reference during the test run prior to the test flight.
- 3.3. Test stands should conform to the standards specified by the engine manufacturer, particularly with regard to cooling scoops and oil coolers. The test stand instruments should be calibrated and checked as often as is considered necessary, but at least once a year. The test clubs used should comply with the specifications of the manufacturer concerned.
- 3.4. Any engine accessory or auxiliary, which has been overhauled, must be tested in accordance with the requirements of the manufacturer and it must be established that it fully meets such requirements before the engine accessory or auxiliary may be certified.

## 4. RECORDING

- 4.1. The following shall constitute the minimum detail to be entered on a Certificate of Release to Service (CRS) after an engine overhaul:

- 4.1.1. The part number of the Overhaul Manual used as well as the revision date of the manual.
  - 4.1.2. Details of all work done.
  - 4.1.3. Reference numbers and abbreviated titles of all the relevant Service Letters, Service Bulletins or other instructions as well as relevant Airworthiness Directives complied with or consulted.
  - 4.1.4. Modifications embodied.
  - 4.1.5. Information to facilitate the identification of such parts and products as were fitted as replacements.
  - 4.1.6. During test running after the overhaul as required by paragraph 3.2 the applicable manufacturer's Service Bulletin or Service Instruction must be adhered to and quoted.
  - 4.1.7. Dual inspection of controls (if applicable).
  - 4.1.8. Any other special tests carried out as required by either the approved Maintenance Schedules or the manufactures.
  - 4.1.9. Job card number.
- 4.2. All products regarded by the manufacturer as mandatory replacements at overhaul must, on installation, be identified as such on the CRS, where after concomitant mention of the manufacturer's Service Bulletin (e.g. Textron Ly coming S.B. 240M) in an entry will suffice. Other products replaced must be described in detail, the entry including part numbers and (where such exist) serial numbers. Whenever parts are used which were not manufactured by the original manufacturer (i.e. FAA PMA parts), these must be clearly identified as such on the CRS.
- 4.3. In the case of an engine overhaul the content of the CRS shall be in typescript and presented in the manner prescribed in NAM-CATS-GMR 43.02.15.

## 5. RETENTION OF RECORDS

Engine overhaul facilities shall retain records of engine and component overhauls for a period of not less than 10 years.

6. In the case of an inspection following a propeller strike, unless the complete engine is being overhauled as per the manufacturer's requirements, such inspection, irrespective of replacements, shall constitute a repair only and not affect, or extend the time between overhauls. The re-assembly of the cylinders and Class II products specified in para 7.1, shall be done and certified by the Approved Maintenance Organisation responsible for the propeller strike inspection and test run in accordance with para 7.5.

## 7. DEFINITION OF A BASIC ENGINE OVERHAUL

An engine, being a Class I product which relies on a number of Class II products to produce the power required of it, shall be deemed to have been completely overhauled when the following requirements have been met:

- 7.1. The engine and its Class II products, notably the ignition system, the fuel system, and (when fitted) the turbo charging system must have been overhauled according to the prescriptions of the manufacturers and individually tested according to the prescriptions of the manufacturers on the apparatus specified by them.
- 7.2. All mandatory replacements must have been made, as well as those found on inspection to be necessary.

- 7.3. All relative service information must have been fully complied with.
- 7.4. The required record of fits and clearances must have made in the sequence indicated in the respective manuals.
- 7.5. The engine together with the Class II products specified in paragraph 7.1 must have been tested as one unit on a test bench or in an airframe in accordance with the manufacturers laid down procedures and must have been found satisfactory by the organisation certifying the overhaul.