

File No. 8/82/64-AI(1)

EFFECTIVE : FORTHWITH

Subject: **Maintenance Control by Reliability Method.**

The requirements of CAR are applicable to all Scheduled Airlines which hold approval in Category 'C', as per classification contained in Civil Airworthiness Requirements Series 'E' Part I.

1. PURPOSE:

- 1.1 The Maintenance Control by Reliability Method will alert the organisation in time and help it in identifying the potential problems existing on its aircraft, engines and accessories and will thus enable it to take preventive/curative measures expeditiously.
- 1.2 The method permits an organisation having sizable fleet of aircraft to amend and refine its existing system of maintenance in respect of each type of aircraft and its major components, in its fleet, in consultation with Regional Airworthiness Office of DGCA, so as to improve the service reliability of its fleet.

2. APPLICATION :

- 2.1 Every scheduled airline operator shall submit its Maintenance Reliability Control Programme in the manner specified below for approval to the Director General of Civil Aviation, New Delhi, through the Regional Airworthiness Office.
- 2.2 The programme, after its approval, shall become a part of Quality Control Manual of the Operator.

3. DETAILS OF PROGRAMME :

- 3.1 The operator will describe in its programme the procedure of collection of information relating to observed/reported defects in aircraft systems and/or components, investigation of defects, analysis of the results and the manner of computing 'Alert Values', spelling out the responsibility within the organisation for monitoring the actual performance trends vis-a-vis Alert Values, and for initiating timely corrective/preventive measures.

4. FUNCTIONING :

- 4.1 All organisations will create a 'Reliability Monitoring Unit' (RMU) in the Quality Control Division which will be entrusted with the responsibility of gathering information from various sources for analysis in order to determine

reliability trends of systems/components/structure of the aircraft operated by them.

4.2 The Reliability Monitoring Unit will, in coordination with specialists, develop and introduce remedial measures to restore normal established trends within acceptable limits of performance.

5. SOURCES OF INFORMATION :

5.1 The aircraft are maintained in continuous state of airworthiness by means of Scheduled and Unscheduled maintenance. The Scheduled Maintenance consists of servicing aircraft and its systems at designated time intervals, component changes at predetermined periods, scheduled inspections and scheduled modifications. The Unscheduled Maintenance consists of corrective maintenance brought about as a result of pilot reported defects and other inspection "Finds".

5.2 The Reliability Monitoring Unit will gather information from both Scheduled Maintenance and Un-scheduled Maintenance for Reliability control. The likely primary sources of information will be:-

- (i) Unscheduled removals.
- (ii) Confirmed failures.
- (iii) Deficiencies observed and corrected during scheduled services but otherwise not reportable.
- (iv) Pilot reports.
- (v) Sampling inspections.
- (vi) Shop findings/Bench Check reports.

6. INFORMATION ANALYSIS AND REMEDIAL MEASURES :

6.1 The operator will describe in the programme, its system of data analysis and its application to Maintenance Control Programme. It will describe in detail types of action which will be triggered by the persons whenever trends reveal abnormal level of reliability.

6.2 The aircraft system reliability will be measured by the number of pilot reported defects applicable to the system per 1,000 flight hours.

6.3 If the system is over the alert, an 'Alert Notice' will be issued by Reliability Monitoring Unit to all concerned persons in his organisation and a report in duplicate will be forwarded to the Regional Airworthiness Office on 25th of every month.

6.4 Where applicable, this information will also contain in summary form the measures adopted by the operator in controlling the situation. The information will contain pertinent comments/reports offered by specialists,

- manufacturers, etc., and will, if possible, contain extent of progress achieved.
- 6.5 Subsequent reports will continue to be sent to the Regional Airworthiness Office till the performance returns below the Alert Value.
- 6.6 The Regional Airworthiness office will relay one copy of the report to DGCA (Attention: Director of Airworthiness) within 72 hrs. of receipt of the same.
- 6.7 All aircraft systems will be recorded as per ATA-100 code.
7. ESTABLISHING ALERT VALUES :
- 7.1 Statistical techniques in arriving at Reliability Control figures (Alert Values) will be used. The Alert Values will be numerically equal to the "Mean Value" plus "Two Standard Deviations".
- 7.2 The figures/standards will be justified by an operator in the light of operator's own experience supplemented by any other appropriate industry experience, if available.
- 7.3 The operator may at his discretion provide a Reliability band or range for measuring its quality of maintenance and if accepted by the Airworthiness Authorities will form the reference standard which shall be met by the operator.
8. RELIABILITY DISPLAYS :
- 8.1 The operator shall develop monthly graphic displays covering the operating experience for the previous period including details of corrective action taken or planned when the established standard is not met, of major affected systems.
- 8.2 These displays should summarise operating experience at least for the last three months.
- 8.3 These displays and supporting data will be available for examination to the representatives of DGCA. The operator, on request, shall furnish all data derived from its displays to the representatives of DGCA.
- 8.4 All systems, components will be identified by a suitable system.
- 8.5 Displays should cover following details and will be forwarded to the Regional Airworthiness Office by the 25th of each month:
- (a) Aircraft system and/or component reliability numerically expressed as the number of reported failures per 1000 aircraft hours or other appropriate denominator.

- (b) Aircraft system and/or component reliability numerically expressed as the number of non-routine removals per 1000 aircraft hours or other appropriate denominator.
  - (c) Aircraft system and/or component reliability numerically expressed as the number of confirmed failure per 1000 aircraft hours or other appropriate denominator.
  - (d) Graphic presentation of (c) operating experience in relation to the level of performance established.
- 8.6 All above said displays will be preserved by the operator for atleast two years.
9. CHANGES IN MAINTENANCE CONTROL RELIABILITY METHOD :
- 9.1 The programme furnished by the operator will include a procedure explaining in detail any change in the system which needs prior approval of the Airworthiness Authorities.
- 9.2 Following changes will require prior approval of DGCA:-
- (a) Change in policy regarding method of computing performance number (Alert Value).
  - (b) Any upward change in TBO or 'service-time-increase' in schedule.
  - (c) Change in displays that would alter the type of information or frequency of information.
  - (d) Transfer of system/component from one type of control to other method of control.
  - (f) Data collection system.
  - (g) Data analysis Method.
10. DEFINITIONS FOR THE PURPOSE OF PROGRAMME :
- 10.1 Each Reliability Programme submitted by the operator to DGCA will contain definitions of the significant terms used therein. The definitions should include, but not limited to, "System Failure", "Component Failure", "Functional Check", "Unscheduled Removals" and any other terms which are basic to the particular system.

Sd/-  
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