



**GOVERNMENT OF INDIA
OFFICE OF THE DIRECTOR GENERAL OF CIVIL AVIATION
TECHNICAL CENTRE, OPP SAFDURJUNG AIRPORT, NEW DELHI**

**CIVIL AVIATION REQUIREMENTS
SECTION 2 - AIRWORTHINESS
SERIES 'C', PART I
12TH MARCH, 1980**

EFFECTIVE: FORTHWITH

Subject:- Defect Recording, Reporting, Investigation, Rectification and Analysis.

- 1 Introduction :** Rule 60 of Aircraft Rules 1937 lays the Maintenance and Certification standards required in respect of civil registered aircraft. Sub rule 5 of the said rule states that no aircraft shall commence any flight, if subsequent to the issue of a certificate in pursuance of this rule, it has suffered any damage or revealed any defect, other than items covered in the approved list of deficiencies, which would render the aircraft unsafe for flight and which would not, in accordance with the ordinary aeronautical practice, be remedied by the pilot or crew.

Rule 59 of Aircraft Rules 1937 lays that a Major Defect in or Major Damage to an aircraft registered in India shall be reported in the manner specified by DGCA.

This part of Civil Aviation Requirements specifies the manner in which defects in aircraft and aircraft components are to be recorded, reported, investigated and analyzed for the purpose of taking timely corrective/preventive action. This CAR also, classifies major defects in to two groups, i.e. Group-I and Group-II. This CAR is issued under the provisions of Aircraft Rule 133A of the Aircraft Rules 1937.

2 DEFINITIONS:

- 2.1 Aircraft component:** means any part, the soundness and correct functioning of which, when fitted on an aircraft, is essential to the continued airworthiness or safety of the aircraft, or its occupants.
- 2.2 Defect:** means a condition existing in an aircraft (including its systems) or aircraft component arising from any cause other than damage, which would preclude it or another aircraft component from performing their intended functions or would reduce the expected service life of the aircraft or aircraft component.

- 2.2.1 **Major Defect:** means a defect of such nature that reduces the safety of the aircraft or its occupants and includes defects discovered as a result of the occurrence of any emergency or in the course of normal operation of maintenance.
- 2.2.2 **Repetitive Defect:** means a defect in an aircraft (including its components and systems) which recurs, inspite of rectification attempt, on the same aircraft.
- 2.3 **Maintenance:** The performance of tasks required to ensure the continuing airworthiness of an aircraft including any one or combination of overhaul, inspection, replacement, defect rectification, and the embodiment of a modification or repair.
- 2.4 **Repair:** The restoration of an Aeronautical product to an airworthy condition to ensure that the aircraft continues to comply with the design aspects of the appropriate airworthiness requirements used for the issuance of the Type Certificate for the respective aircraft type, after it has been damaged or subjected to wear.
- 2.4.1 **Major Repair** means a design change that is intended to restore an aeronautical product to an airworthy condition.
- (i) when the damage or wear being repaired or restored to airworthiness condition might appreciably affect the weight, balance, structural strength, performance, power plant operation, flight characteristics, or other qualities affecting airworthiness or environmental characteristics or
 - (ii) that will be embodied in the product using nonstandard practices.
- 2.4.2 **Minor Repair** means a repair other than a major repair.
- 2.5 **Operator** means a person, organisation or enterprise engaged in or offering to engage in aircraft operation;
- Note :- All Scheduled, Non Scheduled , State Government / BSF aircraft , Private aircraft operator and any other organization or person engaged in aircraft operation fall under the scope of this definition .
- 2.5.1 **Scheduled Operator:** means an aircraft operator which operates its fleet, whole or part of it, as per a published schedule.
- 2.6 **Approved Organization (AO)** means an organization approved by DGCA engaged in manufacture, maintenance, processing, testing, storage and distribution of civil aircraft, aircraft components, items of equipment, aircraft goods and Training School.
- 2.7 **Approved Maintenance Organization (AMO)** means an organization approved by DGCA in Category "C" in accordance with CAR Section 2 Series E part I.

- 2.8 **Aircraft Fleet:-** Minimum Three aircraft of a particular type / Model shall constitute a fleet for the purpose of this CAR.

3. Applicability :

This CAR applies to all Operators /Organisations engaged in operation and Approved Maintenance Organisations (AMOs) .

Note:- All Scheduled, Non Scheduled, Aerial work aircraft, State Government / BSF aircraft & private aircraft operators, flying clubs and Approved Maintenance Organisations (AMOs) shall therefore be covered under the purview of this CAR.

For easy stipulation and understanding, the requirements in this part of the CAR have been classified as applicable to **Scheduled Operators** and **Operators Other Than Scheduled Operators**.

4. Procedures for defect recording, reporting, investigation, rectification and analysis:

- 4.1 All organizations as stated in Para 3 above shall have a system in their organization to ensure that all defects, minor or others, whether reported by Flight Crew or observed by Maintenance Crew (including those occurred due to improper maintenance practices) are recorded and investigated for taking appropriate rectification action.
- 4.2 The rectification action taken in respect of each defect shall be recorded alongside of the snag reported.
- 4.3 "Classification of Defects": All recorded defects shall be examined by experienced and qualified personnel of the operator for the purpose of classification . A list Of defects classified as major defects in Group I & Group II is indicated as a guideline at Appendix I.
- 4.4 Where an Operator / Organisation has contracted the maintenance of its aircraft to an Approved Maintenance Organisation (AMO) , it shall be the responsibility of the operator to comply with this CAR and report such defects observed on its (Operator's) aircraft during maintenance at the AMO facilities. Further both Operators / Organisation and the AMO shall evolve a system between themselves in such a manner so as to comply with all the requirements of this CAR. The system so established shall be included in the Quality Control Manual and / or Operations Manual (as the case may be) of both the Organisations. The AMO shall however maintain record of all the defects observed on the aircraft, of an operator, in respect of which the maintenance has been contracted to it (AMO). The AMO will produce such records for scrutiny by DGCA officers when required.
- 4.5 **"Initial Information":** - All defects classified as "major" or those requiring "major repair" or which are serious in nature and attracting public attention shall be intimated immediately on telephone by all Operators / Organisations to RAWO followed by written information . The written information containing complete details shall be forwarded , in Case of ;

4.5.1 Scheduled Operators : within 24 hours of the occurrence .

4.5.2 Operators Other Than Scheduled Operators with in three days of the occurrence of the defect. At least the following information will be indicated

- a. Name of the Organization / Operator
- b. Aircraft type and registration No.
- c. Date and place of occurrence of the defect
- d. Details of the defect(s) and the rectification action taken

Note :- The complete details of defect(s) in case of defects reported on an aircraft at outstations may be sent on receipt of information by the "main (maintenance) base" of a Scheduled Operator with in a maximum period of *three* days unless otherwise required by the concerned RAWO, .

The format for reporting defect(s) prescribed at Appendix 'II '.

4.6 All defects, whether major or not and including repetitive ones, shall be taken into account for computing statistics for determining components/systems reliability indices in case of scheduled operators , as called for in the CAR Series 'C' Part V, and each repetition of the defect shall be considered as "a defect" for the purpose of computation of reliability index provided rectification was attempted.

4.7 Review of Defects Reported on aircraft : -

All operators shall evolve a system for undertaking a prompt review, by experienced and qualified technical personnel, of the nature of defects (whether major or other) and the adequacy of rectification action taken in respect of each defect (including that of repetitive defects) reported/observed on each aircraft of its fleet, no sooner the aircraft returns to its "main base (including temporary base)", from where it had departed last.

4.7.1 Scheduled Operators: Scheduled Operators shall carry out " Daily Review " of the defects reported on the aircraft of the fleet.

4.7.2 Operators Other Than Scheduled Operators: The periodicity of review of the defects reported on the aircraft of the fleet of operators other than scheduled operators may be fixed by the operator in consultation with the RAWO , depending upon the type / quantum of operation and size of the fleet of aircraft.

4.7.3 The **Regional Airworthiness Officers** may associate themselves with this review and ask for any additional information, or performance of such additional work considered necessary to rectify the defect and to render the aircraft serviceable.

4.8 Investigation of Delays & Defects ;

- 4.8.1 **Scheduled Operators** "Defects causing Mechanical delays on aircraft operated by Scheduled operators" : Delay to a scheduled service of 15 minutes' duration or more, on account of aircraft defect (whether major or not), shall be reported to Regional Airworthiness Office within 24 hours (working hours of Airworthiness Office) of receipt of information about the delay by the "main maintenance base" (for the type of aircraft involved) of an operator as per the format given in ' Appendix III ' or giving at least the following information:-
- (a) Service Number, date and place of delay
 - (b) Type and Registration No. of the aircraft
 - (c) Duration of Delay
 - (d) Brief reason for the delay and the rectification action taken.
- 4.8.2 For investigation of defects as per para 4.1, including defects causing delay a senior Technical Person of the operator, acceptable to DGCA, shall be approved by DGCA for supervising the compliance of the system and shall form a part of the Quality Control Organization of the operator. The system shall also be included in the operator's approved Quality Control Manual. The senior technical person shall have adequate number of technical persons, approved by the Quality Control Manager of the operator in accordance with the qualifications and experience norms as stipulated by DGCA, to assist him in different aspects of various investigations.
- 4.8.3 **Operators Other Than Scheduled Operators**, Quality Control Manager or his representative shall supervise the compliance of the system for investigation of defects detailed in preceding paragraphs.
- 4.8.4 The investigation of all defects and particularly of Major Defects and Mechanical Delays (referred in para 4.8 above), shall be completed expeditiously, so as to take preventive/corrective action at the earliest possible. In case the completion of investigation of a major defect is likely to take longer than one month, then investigation progress reports must be rendered to concerned Regional Airworthiness Office every month till the finalization of the report. All efforts must be made by an operator to complete the investigation of every major defect within 3 months of its occurrence.
- 4.8.5 The major defect, (including those requiring "major repair") will be investigated by the operator in association with the concerned Regional or Sub-Regional Airworthiness Offices. Airworthiness Officer(s) may require the operator or the owner of the organization, to submit components, work sheets, documents and information connected with the defect, for such investigation.
- 4.8.6 The investigation reports on major defects / mechanical delays shall be sent by the operator / organisation, in duplicate, to concerned Regional Airworthiness Office soon after finalisation. The final report shall contain at least the following information, in addition to these forwarded vide para 4.5 (above):-
- (a) Identification of parts/systems involved.
 - (b) Apparent or actual cause of the defect.

- (c) Life of affected component since new and since last inspection, in terms of flight hours/landings/cycles.
- (d) Action taken by the operator to prevent recurrence.
- (e) Any disciplinary action, taken by the operator, against any of its employees, and
- (f) Whether the operator considers the investigation "closed" or "open" and if "open" the time it would take to complete the investigation.

One copy of the report on major defects shall be forwarded to DGCA (attention DAW) by Regional Airworthiness Office along with its comments.

NOTE :- "PURPOSE OF INVESTIGATION" : THE PURPOSE OF INVESTIGATION IS TO AVOID RECURRENCE OF DEFECTS. THUS RAISING THE STANDARD OF AIRWORTHINESS AND ENHANCING THE LEVEL OF SAFETY OF AIRCRAFT. IN THIS SPIRIT THE EFFORTS OF THE INVESTIGATORS SHOULD BE TO DETERMINE THE CAUSE OF THE DEFECT, RATHER THAN WHO CAUSED IT. HOWEVER, DURING THE INVESTIGATION, IF IT IS DETERMINED THAT THE DEFECT WAS CAUSED BY CARELESS AND CASUAL ATTITUDE OR DUE TO WILLFUL NEGLIGENCE OF TECHNICAL PERSONNEL, THEN THE DISCIPLINARY ACTION AGAINST THE ERRING EMPLOYEES SHOULD BE TAKEN IN CONSULTATION WITH DGCA, SO AS TO AVOID DUPLICATED PENAL ACTION AGAINST THE OFFENDER. NATURALLY THE PENAL ACTION SHOULD BE COMMENSURATE WITH THE SERIOUSNESS OF THE OFFENSE AND ALSO KEEPING IN VIEW THE PAST PROFESSIONAL RECORD OF THE OFFENDER..

5 Defect monitoring:

- 5.1 The Regional Airworthiness Officers may require operators/maintenance organisations to furnish such additional information about the investigation of the defect as considered necessary by them, either for "closing" the case or for conducting further investigation on their own. The operator shall furnish such additional information.
- 5.2 The Regional Airworthiness Offices shall ensure that Quality Control Department of all operators/Aircraft maintenance Organisations (AMOs) are adequately staffed to discharge the duties and responsibilities prescribed in paras 4.1 to 4.8 The Regional Airworthiness offices may also carry out spot checks on the records of operators to ascertain if the system spelt out in preceding paragraphs, and particularly the classification of defects, as called for in para 4.3 above, is being followed.
- 5.3 The major defect, (including those requiring "major repair") will be investigated by the operator in association with the concerned Regional or Sub-Regional Airworthiness Offices. Airworthiness Officer(s) may require the operator or the owner of the organization, to submit components, work sheets, documents and information connected with the defect, for such investigation.
- 5.4 The operator shall intimate the corrective action(s) taken on the recommendation(s) made in the investigation report (finalised in accordance with para 5.3 above) along with a copy of the investigation report to the Regional Airworthiness Office. A copy of the report shall also be forwarded to DGCA (Headquarters - Attention DAW).

5.5 An operator/ AMO shall periodically, at least once in three months , analyse the investigation results of all the defects, whether major or not, collectively to determine, weakness, if any , in the basic design of a component or in the lay out of a system or in the maintenance technique adopted to perform the work involved , exists. If weaknesses are detected, then necessary corrective action shall be taken by the operator / AMO under intimation to Regional Airworthiness Office. All faults, malfunctions, defects and other occurrences which cause or may cause service difficulties or any adverse effects on the continuing airworthiness of the aircraft shall be reported by all operators / approved maintenance organizations, to the manufacturers/designer of the aircraft/engine/propeller/system/ components at the earliest but not later than seven days of the occurrence , for a continuous assessment of the design features of the aircraft. The type of information which the operator should provide to the manufacturer assessing the reported service difficulties and rendering advice is given at 'Appendix IV ' to this CAR.

5.6 Operators / Organisation shall ensure;

- a) continued Airworthiness of the aircraft during its service life.
- b) compliance with the appropriate airworthiness requirements after a modification, repair or installation of replacement part; and
- c) that the aircraft is maintained in an airworthy condition as per the maintenance programme and is in compliance with the maintenance requirements specified in Aircraft Rules , CAR and by the manufacturer of the aircraft .

5.7 The Regional or Sub-Regional Airworthiness Office, may require any operator, notwithstanding the requirements stipulated in this part of the CAR, in the interest of safety of aircraft, to submit:-

- (a) full details of any defect(s), or
- (b) any component associated with the defect or delay investigation.

The said components shall not be disposed off in any manner without the prior approval of the concerned Regional / Sub-Regional Airworthiness Office.

6. Fleet Performance, Engineering Statistics and Analysis:

(This item may be read in conjunction with AAC 5 of 2001)

6.1 **Scheduled Operators** shall prepare a monthly report in respect of fleet performance and engineering statistics for determining the reliability of aircraft components and aircraft system, as required vide CAR Series 'C' Part V. The monthly statistics shall at least include the following:-

- (a) Premature removal rate of all components.

- (b) Brief information about individual "in-flight shut-down (including flame-out)" and inflight shut-down rate of all types of engines in the fleet.
- (c) Brief information about individual abortive "take-off"; and
- (d) Number of "take-offs" per delay (of 15 minutes' duration or more, including the cancelled flights)

6.2 **Operators Other Than Scheduled Operators** shall forward the fleet performance report quarterly .

A copy of the "Fleet performance and engineering statistics" report shall be forwarded each to Regional Airworthiness Office and to DGCA (Headquarters, attention DAW).

7. PRESERVATION OF RECORDS AND COMPONENTS:

- 7.1 The records, associated with the defects and their rectification actions, shall be preserved for a period of one year and may be required for consultation at the time of renewal of C of A of an aircraft.
- 7.2 The components, associated with the major defects shall be preserved for a period of two weeks from the date of intimation of the defect, unless required (in writing), by the concerned Regional and Sub-Regional Airworthiness Office, to be preserved longer.

Sd/-
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Appendix – I

CLASSIFICATION OF MAJOR DEFECTS

Given below is a list of Major defects, classified into two Groups i.e. Group-I and Group-II. The list is only a guideline and is not exhaustive. Each operator shall report the occurrence or detection of any one or more major defect so classified either in Group-I or Group-II.

Group-I

- a. fires during flight;
- b. fires during flight not protected by a related fire warning system;
- c. an engine exhaust system that causes damage during flight to the engine, adjacent structure, equipment or components;
- d. engine shutdown during flight with external damage to the engine or aircraft structure occurs;
- e. defect to an aircraft component that causes accumulation or circulation of smoke, vapour, or toxic or noxious fumes in the crew compartment or passenger cabin during flight;
- f. any other major damage/ defect requiring extensive repair/ inspection/ modification to the aircraft (or/and in cases as desired by local DAW office).

Group-II

- a. false fire warnings during flight;
- b. engine shutdown during flight because of flame-out;
- c. engine shutdown during flight due to foreign object ingestion or icing;
- d. shutdown during flight of more than one engine;
- e. defect of a propeller feathering system or ability of the system to control over-speed during flight;
- f. Defect of a fuel or fuel-dumping system that affects fuel flow or causes hazardous leakage during flight;
- g. defect related to landing gear extension or retraction, or opening or closing of landing gear doors , during flight;

- h. brake system components that result in loss of brake actuating force when the aircraft is in motion on the ground;
- i. damage to aircraft structure that requires major repair;
- j. cracks, permanent deformation, or corrosion of aircraft structure, if more than the maximum acceptable to the manufacturer or the DGCA;
- k. damage of aircraft components or systems that result in taking emergency actions during flight (except action to shut down an engine);
- l. each interruption to a flight, unscheduled change of aircraft en route, or unscheduled stop or diversion from a route, caused by known or suspected mechanical difficulties or malfunctions;

Note: *Occurrence of a major defect falling under the classification of Group-I requires rectification of the defect and validation/ restoration of Certificate of Flight Release. (as per CAR Section 2-Airworthiness series F Part VIII)*

Appendix - II

FORMAT OF DEFECT REPORT

NAME OF THE ORGANISATION: -

TYPE OF AIRCRAFT: -

TYPE OF ENGINE: -

A/C REGN: VT-_____ PLACE OF OCCURANCE : _____

DATE OF OCCURENCE:

FLIGHT NO : _____ SECTOR : _____

SNAG REPORTED BY PILOT/OBSERVED BY AME: -

NAME OF PILOT / AME AND LIC. NO. _____ :

CLASSIFICATION OF DEFECT :- **MAJOR** / **MINOR**
(Strike Out whichever is not applicable)

DETAIL OF DEFECT :

RECTIFICATION ACTION TAKEN :

COMPONENTS REPLACED: (IF APPLICABLE)	P/N	S/N
OFF NO.:	INSTALLED NO. :	

STATUS OF INVESTIGATION : - **OPEN** / **CLOSE**
(Strike Out whichever is not applicable)

REMARKS :

SIGNATURE

NAME :-
DESIGNATION:
LICENCE/APPROVAL NO :-

DATE

APPENDIX - III

FORMAT OF MECHNICAL DELAY REPORT

NAME OF THE ORGANISATION :-

TYPE OF AIRCRAFT : TYPE OF ENGINE :

A/C REGN : VT- STATION :

DATE : FLIGHT NO : SECTOR :

S.T.A. : HRS A.T.A. : HRS

S.T.D : HRS. A.T.D. : HRS

INCASE OF AIR /GRD TURNBACK (a) INITIAL CHOCKS OFF HRS
(b) BACK TO BAY AT HRS

SNAG REPORTED BY **PILOT** / OBSERVED BY **AME** AT : HRS MTS.
(Strike Out whichever is not applicable)

NAME OF PILOT OR AME,(AS APPLICABLE) :

DURATION OF MECHNICAL DELAY * : HRS MTS

OTHER DELAYS IF ANY. : HRS MTS

TOTAL DURATION OF DELAY : HRS MTS

TIME A/C DECLARED SERVICEABLE : HRS MTS

CLASSIFICATION OF DEFECT: - **MAJOR** / **MINOR**
(Strike Out whichever is not applicable)

DETAIL OF DEFECT :

RECTIFICATION ACTION TAKEN:

DETAIL OF COMPONENTS REPLACED Pt. NO. S.NO.

OFF
ON

STATUS OF INVESTIGATION : - **OPEN** / **CLOSE**
(Strike Out whichever is not applicable)

REMARKS (IF ANY)

SIGNATURE

NAME
DESIGNATION

LICENCE/APPROVAL NO
DATE

APPENDIX - IV

**INFORMATION ON SERVICE DIFFICULTIES AND DEFECTS TO BE
REPORTED BY THE OPERATOR TO THE MANUFACTURERS**

1. Name of the Organisation
2. Type and registration and serial no. of the aircraft
3. Nature of the defect and circumstances under which it was detected
4. Description of damage to applicable part or system
5. Aircraft and/or component hours/landings/cycles
6. Whether difficulty resulted in any adverse effect on other parts of the aircraft
7. Previous inspections or modifications, if any, of the part
8. Apparent cause of failure, malfunction or defect
9. Action taken or planned
