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**

F. No. 11-690/Sec-2/C-I/2002-AI(2)

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

1 Introduction :

1.1 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.

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

1.3 This Civil Aviation Requirements specifies the manner in which defects/ service difficulties in aircraft and aircraft components are to be recorded, reported, investigated and analyzed for the purpose of taking timely corrective/preventive action. 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, and includes any item of equipment.

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, in spite 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 Maintenance Organization (AMO)** means an organization approved by DGCA in accordance with CAR 145 or CAR M Sub Part F.

2.7 **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 and 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 aircraft operators, and maintenance organizations 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 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 Continuing Airworthiness Management Exposition / Maintenance Organisation Exposition (CAME / MOE / MOM) (as the case may be) of both the Organisations. The AMO shall also maintain record of all the defects observed on the aircraft, of an operator, in respect of which the maintenance has been contracted to it. 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 at least the details shall be forwarded, within 72 hours.

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

A sample format for reporting defect(s) prescribed at Appendix 'II', however operator/ AMO may develop an equivalent format and document in their exposition for reporting of major defect / occurrences.

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 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 recorded and investigated.

4.8.2 For investigation of defects as per para 4.1, including defects causing delay a senior Technical Person of the operator, shall be nominated by the organization for supervising the compliance of the system and shall form a part of the Continuing Airworthiness Management Organisation (CAMO). The system shall also be included in the operator's approved CAME. The CAMO shall have adequate number of technical persons, approved by the Continuing

Airworthiness 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:** Continuing Airworthiness 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.

NOTE: Major defect resulting in a reportable incident shall be investigated by the Air Safety Directorate. Results of such investigations shall be communicated to concerned Airworthiness offices for follow up action(s).

4.8.6 The investigation reports on major defects 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 CAMO of all operators and Quality Department of 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 operator shall intimate the corrective action(s) taken on the recommendation(s) made in the investigation report (finalised in accordance with para 4.8.5 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).

5.4 SERVICE DIFFICULTY REPORTING SYSTEM

5.4.1 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/ type design organisation of the aircraft/engine/propeller/system/ components at the earliest but not later than three 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 / type design organisation for assessing the

reported service difficulties and rendering advice is given at 'Appendix III ' to this CAR.

5.4.2 **Significant reports**

(a) The following significant reports warrant immediate notification to DGCA, State of Registry (in case of Wet lease aircraft) and manufacturer/Type Design Organisation by telephone or report:

(i) primary structure failure;
(ii) control system failure;
(iii) fire in the aircraft;
(iv) engine structural failure; or
(v) any other condition considered an imminent hazard to safety.

(b) The telephone or report should follow the format of the SDR and, being of an alert nature, should contain the following information when available and relevant:

(i) aircraft owner's name and address;
(ii) whether accident or incident;
(iii) related SBs, service letters, ADs; and
(iv) disposition of the defective parts.

5.5 The Regional or Sub-Regional Airworthiness Office, may require any operator, notwithstanding the requirements stipulated in this 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. 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.

6.3 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 issue / extension of ARC 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.

(B. S. Bhullar)
Director General of Civil Aviation

Appendix – I

CLASSIFICATION OF MAJOR DEFECTS

Given below is a list of Major defects. The list is only a guideline and is not exhaustive. Each operator shall report the occurrence or detection of each failure, malfunction or defect concerning at least the following:

a. fires during flight, and whether or not a fire warning system was installed and functioned properly;
b. false fire warnings during flight;
c. an engine exhaust system that causes damage during flight to the engine, adjacent structure, equipment or components;
d) 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;
e) engine shutdown during flight because of flameout;
f) engine shutdown during flight when external damage to the engine or aircraft structure occurs;
g) engine shutdown during flight due to foreign object ingestion or icing;
h) shutdown during flight of more than one engine;
i) a propeller feathering system or ability of the system to control over-speed during flight;
j) a fuel or fuel dumping system that affects fuel flow or causes hazardous leakage during flight;
k) a landing gear extension or retraction, or opening or closing of landing gear doors during flight;
l) brake system components that result in loss of brake actuating force when the aircraft is in motion on the ground;
m) aircraft structure that requires significant repair;
n) cracks, permanent deformation, or corrosion of aircraft structure, if more than the maximum acceptable to the manufacturer or the CAA;
o) aircraft components or systems that result in taking emergency actions during flight (except action to shut down an engine);
p) 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;
q) the number of engines removed prematurely because of malfunction, failure or defect, listed by make and model and the aircraft type in which it was installed; and
r) the number of propeller featherings in flight, listed by type of propeller and engine and aircraft on which it was installed.

In addition to the reports required above, each operator should report any other failure, malfunction or defect in an aircraft that occurs or is detected at any time, if in its opinion, the failure, malfunction or defect has endangered or may endanger the safe operation of the aircraft.

Appendix - II

SAMPLE 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: P/N S/N
(IF APPLICABLE)

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

INFORMATION ON SERVICE DIFFICULTIES AND DEFECTS (TO BE REPORTED BY THE OPERATOR TO THE MANUFACTURERS/ TYPE DESIGN ORGANISATION)

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
