



सत्यमेव जयते

HANDBOOK OF PROCEDURES

FOR
ISSUE OF TYPE CERTIFICATE/ SUPPLEMENTAL TYPE CERTIFICATE,
APPROVAL OF DESIGN ORGANISATIONS,
APPROVAL OF CHANGES / REPAIRS, ITSOA PROCEDURE
APPROVAL OF FLIGHT CONDITIONS FOR ISSUE OF PERMIT TO FLY, FLIGHT
TEST GUIDE,
APPROVAL OF TEST PILOTS
AND
GUIDELINES FOR THE PERSONNEL OF
AIRCRAFT ENGINEERING DIRECTORATE

AIRCRAFT ENGINEERING DIRECTORATE
OFFICE OF THE DIRECTOR GENERAL OF CIVIL AVIATION
TECHNICAL CENTRE
OPP. SAFDARJUNG AIRPORT
NEW DELHI-110003



GOVERNMENT OF INDIA
OFFICE OF THE DIRECTOR GENERAL OF CIVIL AVIATION
TECHNICAL CENTRE
OPP. SAFDARJUNG AIRPORT
NEW DELHI-110003

HANDBOOK OF PROCEDURES

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Subject : HANDBOOK OF PROCEDURES - AED-HDBK, Revision -4.

The objective of this Handbook of Procedure is to establish the general principles to be followed by DGCA to perform environmental and airworthiness certification of aeronautical products, parts and appliances, including post certification activities, in accordance with the applicable CAR and AMC & GM. The “Handbook of Procedures, Revision 3” has been revised in order to harmonise the procedural requirements for certification of aeronautical products and parts with the procedures followed by international regulatory authority. A comprehensive revision has been carried out to bring the “Handbook of Procedures” in line with CAR 21, issue II, rev. 0 and certification procedures followed by international civil aviation authorities.

This “Handbook of Procedures, AED-HDBK, Revision 4” has been issued for guidelines of officials of AED for the purpose of issue of type certificates / supplemental type certificates, design organisation approval, repair/change approval, continued airworthiness approval, approval of flight conditions to issue permit to fly, flight tests, ITSOA and approval of test pilots. The contents of this Handbook have been taken from relevant subparts of Civil Aviation Requirements.

-sd/-

(CHARAN DASS)

Deputy Director General of Civil Aviation.
New Delhi.

RECORD OF REVISIONS/AMENDMENTS

Amendment No.	Date of Issue	Description	Insertion	Incorporated by
Rev. 0, Amdt. No. 0	Spt. 1999	The handbook covers procedure for issue of type certificate, type approval, flight test guide, advisory circulars.		R & D
Rev 0 Amdt No. 1	3-09-01	Supplemental Type Certificate is added at page No. 6, paragraph 8. Editorial change at page No. 7 because of amendment at page No. 6 Amendment No. 1/01, Effec: 3-09-01 A NOTE is added at page No. 8 (Subpart II of Part I) A NOTE is added at page No. 8. (Part II) A NOTE is added at page No. 26 (Part III)	Pages 6,7, 8 and 26.	R&D Dte.
Rev 0 Amdt No. 2	5-7-02	AC 01 of 2002 is added at page No. 38.	Pages 38, 39 and 40	R&D Dte.
Rev 0 Amdt No. 3	5-8-04	Requirements for Design Organisation Approval in Part II are amended as per the requirements of CAR 21.	II-1 to II-9	R&D Dte.
		Guidelines for the officers of R&D Dte. is included in Part VI	VI-1 to VI-2	R&D Dte.
		Numbering of pages are changed . Pages are numbered according to their Part No. and corresponding page No.		R&D Dte.
Revision 1,	March , 2005	Text revised	Page No. I-1 to I-10	R&D Dte.
		Text revised	Page No. II-1 to II-10	
		Text revised	Page No. III-1 to III-7	
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Revision 2,	Decem ber, 2005	Text revised	Page No. I-4, I-6 to I-10	R&D Dte.
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RECORD OF REVISIONS/AMENDMENTS

Amendment / Revision No.	Date of Issue	Description	Insertion	Incorporated by
Revision 3,	March, 2007	Text revised	Page No. I-3,4,5,9,11,12	AED.
		Text revised	Page No. II-2,6	
		Text added	Appendix B, C and D	
Revision No. 4, Amendment No. 0	1-08-08	1. Part I to Part III are deleted and new parts are introduced. Some paragraphs of Part I and III are retained.	Part I to Part 9	AED
		2. Part IV, V and VI are retained and introduced as new parts.	Part 10 to Part 12	
Revision No. 4, Amendment No. 1	15-2-10	The text "Aircraft Engineering Division" is replaced by "Aircraft Engineering Directorate".	Through out the document.	AED
Revision No. 4, Amendment No. 2	7-7-10	A new para on 'interaction with military organisation' is introduced in Part 1	Para 6.3 of Part 1	AED
Revision No. 4, Amendment No. 3	22-09-2010	Part 5 is amended to include surveillance procedure as per Surveillance Procedure Manual	Para 4.4 and para 7.0 of Part 5 modified.	AED
Revision No. 4, Amendment No. 4	21-12-2011	Part 8 is amended to incorporate the detailed requirements relating to acceptance of aircraft certified by the contracting states.	Para 3.0 and annexure II of Part 8	AED

Note : Erstwhile Research & Development Directorate (R&D Dte.) has been renamed as Aircraft Engineering Directorate (AED) of DGCA.

Handbook of Procedures

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AIRCRAFT ENGINEERING DIRECTORATE
DIRECTORATE GENERAL OF CIVIL AVIATION
OPP: SAFDARJUNG AIRPORT
NEW DELHI-110003

Handbook of Procedures
PART 1

Type Certification Procedure (TCP) / Restricted Type
Certification Procedure (RTCP)

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0.1 Glossary

Certification Maintenance Requirements (CMR) means the imposition of a maintenance task arising from the certification process, necessary to satisfy the airworthiness requirements.

Certification Review Items (CRI) means a document recording Deviations, Special Conditions, new Means of Compliance or any other certification issue which requires clarification and interpretation, or represents a major technical or administrative issue.

Deviation means any deviation from the applicable Certification requirements (CS/ FAR/ CAR-21).

Equivalent Safety Finding : See CAR 21.21(c)(2).

Imported Product means a product originating from a foreign country to be imported into India.

Special Condition : See CAR 21.16B.

Type Design means the Type Design definition (see CAR 21.31) presented by the applicant and for which compliance is demonstrated with the DGCA Type Certification Basis.

0.2 Abbreviations / Terminology

AED	Aircraft Engineering Directorate
AID	Aircraft Inspection Division (Airworthiness Directorate)
AMC	Acceptable Means of Compliance
AFM	Aircraft Flight Manual
CAR	Civil Aviation Requirements
CM	Certification Manager
CMR	Certification Maintenance Requirements
CRI	Certification Review Item
CS	Certification Specification (Airworthiness Code)
DOA	Design Organisation Approval
DAED	Director, Aircraft Engineering Directorate
DDG	Deputy Director General in-charge of AED (for this document only)
JDG	Joint Director General
DG	Director General
DGCA	Directorate General of Civil Aviation
EASA	European Aviation Safety Agency
ESF	Equivalent Safety Finding
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
ITSO	Indian Technical Standard Order
ICAO	International Civil Aviation Organisation
MoC	Means of Compliance
MMEL	Master Minimum Equipment List
MRB	Maintenance Review Board
OEB	Operations Evaluation Board

PCM	Project Certification Manager
POA	Production Organisation Approval
RTC	Restricted Type Certificate
SC	Special Condition
TC/RTC	Type Certificate
TCP	Type Certification Procedure
TCDS	Type Certificate Data Sheet

1 GENERAL

1.1 Introduction

Rule 49 of the Aircraft Rules, 1937 empowers the DGCA to issue Type Certificate to aircraft/ aircraft engine / propeller manufactured in India and also to validate the Type Certificate issued to the aeronautical products by foreign airworthiness authorities. A Type Certificate issued by the DGCA implies that the design of the type aircraft to which the certificate refers and of the variants specified on the data sheet has been approved by DGCA. The Aircraft Engineering Directorate (AED) of DGCA is responsible for issue/validation of Type Certificate of aeronautical products. This document has been prepared for internal use of officials of the AED to provide them guidance for Type Certification of aeronautical products. This document is revised from time to time to provide updated guidance to the officials of AED on Type Certification of aeronautical products.

1.2 Scope of Procedure

This procedure describes how DGCA internally handles the type certification of aeronautical products. The issue of type certificate is performed in accordance with the provisions of CAR 21 issued by DGCA, which lays down the requirements for the airworthiness and environmental certification of aircraft and related products, parts and appliances and the related Acceptable Means of Compliance (AMC) and Guidance Material (GM). This procedure also describes how DGCA will handle the suspension or revocation of certificates according to the Aircraft Rules and CAR 21. This procedure is also applicable for issue of Restricted Type Certificate.

1.3 References

The Aircraft Rules 1937, CAR 21, Acceptable Means of Compliance (AMC) and Guidance Material (GM) of CAR 21 and ICAO Document 9760.

2 APPLICATION AND ALLOCATION OF TECHNICAL INVESTIGATION TASKS

2.1 Acceptance of Application

Application for a DGCA Type Certificate is submitted to the DAED and made in accordance with CAR 21.15. Application for issue of Type Certificate is to be submitted in the form and format as given in DGCA Form CA 30 (for aircraft and rotorcraft) of CAR-21 in duplicate to the Aircraft Engineering Directorate of DGCA, Technical Centre, Opp. Safdarjung Airport, New Delhi- 110003. AED acknowledges the receipt of application form within two weeks following the date of receipt by DGCA. The fees as per the Aircraft

Rule,1937 / CAR 21 should be paid after receipt of preliminary acceptance letter from AED.

AED examines the application. If an incorrect or incomplete information is provided, the DAED intimates the applicant, as soon as possible by a letter, regarding the omissions and errors. For any technical issue, the DAED may consult the concerned AED officers or any other officers as deemed necessary.

The DAED together with AED officers makes a first check on eligibility according to CAR 21 and determines how it will proceed with processing the application. He communicates the applicable requirements with all relevant information to the applicant within fifteen working days following the date of receipt of application. AED officers to be involved in the Certification Project, are also identified. The DAED takes necessary approval from the DDG before issuing the preliminary acceptance of the proposal.

After the eligibility of the applicant has been fully assessed, the DAED intimates following information to the applicant :

- (a) Whether the application is accepted or not, if not, the reason thereto;
- (b) The projected time frame;
- (c) The project file number (xx/xx- year-AED)
- (d) Preliminary acceptance of the proposal
- (d) Fees associated with the application [Check compliance with DGCA's applicable fees as per Rule 62 of the Aircraft Rules, 1937 / CAR 21]

After receipt of fees the DAED updates the DGCA approvals database with all the relevant information. In case of refusal of an application, the DAED intimates this decision in writing to the applicant together with the reasons thereto.

2.2 Allocation of technical investigations tasks

After eligibility has been fully assessed and once in-principle acceptance is given, the DDG establishes an appropriate DGCA certification team (see 3.2) consisting of AED officers and headed by the DAED. Officers from other Directorates of DGCA are also co-opted as team members depending on the complexity of certification work. Generally, the DAED is allocated with the responsibilities of Project Certification Manager (PCM).

3 CERTIFICATION TEAM

3.1 General

The investigation process for type certification of an aeronautical product is performed by a team of specialists, led by the DAED. The DAED with his team reports to the DDG .

3.2 Determination of the Certification Team

In order to establish an appropriate certification team, the applicant, if deemed necessary by the DDG, organises an initial briefing for general familiarisation with the project. This briefing takes place at a convenient location. The attendance at the initial briefing normally includes AED officers and the officers from other Directorates of DGCA, if deemed

necessary. If the applicant is not familiar with the type certification procedures then the DGCA- Type Certification Procedure is explained,

Following the general familiarisation, the DDG, depending on the category of the product and complexity of the project, appoints a certification team led by a DAED consisting of Deputy Directors, Assistant Directors, Aeronautical Officers and Junior Aeronautical Officers of AED. Officers from other Directorate of DGCA may be included in the certification team depending on the complexity of certification project.

The composition and size of certification teams can vary and is dependent on the product which is to be type certificated. Where the extent of the investigation does not justify the need for a team, one person may perform the investigation.

A certification team for a Propeller may consist of only one specialist, whereas a new Large Transport Aircraft, for example, may need more specialists covering the disciplines of: Flight Test Pilot, Flight Test Engineer, Performance, Structures, Power-plant installation, Fuel systems, Hydro-mechanical systems, Electrical systems, Avionic systems, Transmissions, Electronic Controls & Software, Cabin safety, Environmental Control systems & Icing, Noise & Environmental protection.

3.3 Management of Certification Teams

The AED-officers through monitoring, coordination and management of DAED, aim to ensure equal treatment of applicants across certification projects. To accomplish this, the DDG organises regular co-ordination meetings with DAED, in order to achieve the administrative and technical standardisation across certification projects. Technical training is provided in a regular basis to the officers of AED with-in and outside the country to update their knowledge on Type Certification.

4 CERTIFICATION PROCEDURES

4.1 General

Once an application is accepted and a certification team is established, the DGCA- type certification process is divided in to following phases.

Phase I – Technical Familiarisation and establishment of the Type Certification Basis

The objective of this phase is to provide technical information, the definition, and agreement on the initial DGCA Type Certification basis of the project to the team of specialists of AED.

Phase II – Agreement of the Certification Programme

The objective of this phase is to define and agree on proposed means of compliance and with each paragraph of the Certification Basis and identification of the team involvement with different certification program for each subject.

Phase III – Compliance determinations

The objective of this phase is to demonstrate the compliance with the Certification Basis and acceptance of the compliance demonstration.

Phase IV- Final Report and issue of Type Certificate

The objective of this phase is to establish and justify the compliance demonstration with respect to design requirements, type investigation and, based on approval of final report by the DDG, issue of DGCA-Type Certificate.

4.2 Phase I - Technical familiarisation and establishment of the initial Type Certification Basis.

4.2.1 Technical familiarisation

The DGCA certification team gets familiarised through technical briefings from the applicant about the product in order to fully understand the design, including newly used technologies and any unique or unconventional features or intended unconventional usage of the product. This technical information about design features, which cannot be addressed by the usual applicable certification specification, may be included as Special Conditions in DGCA- Type Certification Basis.

4.2.2 Establishment of the initial Type Certification Basis

Supported by the certification team, the DAED drafts the initial Type Certification Basis which consists of applicable airworthiness code like Certification Specifications (CS) / Federal Aviation Regulation (FAR), environmental protection requirements and may include, if applicable, exemptions /limitations.

Special Conditions, when properly justified, may also form part of the Type Certification Basis. The applicant may also elect to comply to a later amendment of the applicable certification specifications which will then become part of the Type Certification Basis. New Special Conditions, if considered as important by the DDG, will need to undergo a consultation process with the applicant.

The DDG approves the initial Type Certification Basis and any changes to it, based on examination by the officers of certification team. The initial Type Certification Basis may need to be changed during the course of certification process due to new applied technologies, introduction of design changes, discovery of unsafe conditions or compliance demonstration results.

4.2.3 Recording of the Type Certification Basis

The DGCA Type Certification Basis is recorded by the DAED in a Certification Review Item (CRI) document. Any Deviation/Limitation, Special Condition, Equivalent Safety Finding or useful interpretations and alternative means of compliance and Exemptions are presented in detail in a CRI document and become part of the Type Certification Basis.

4.2.4 Intimation on CRI

The PCM intimates the applicant about CRI after examination of the document

4.2.5 Acceptable Airworthiness Design Codes

- a. According to CAR 21.17(a), applicable FAA/ EASA design codes for aeronautical products are to be proposed by the applicant.

- b. The amendment number of the selected design code should be as applicable on the date of TC application. However, before issue of TC for the product, if any amendment to the design code is carried out due to safety/ security reasons, that amendment will also become effective for the certification of the product.
- c. Suitable environmental (emission and noise) protection requirements in line with CAR 21.18(a)&(b) or any such requirement stipulated by DGCA and Subpart I of CAR 21 which prescribes procedure for issue of 'Noise certificate'.
- d. If the aeronautical product is a aircraft, then 'engine/ propeller certification basis' in line with CAR 21.17(a) should be indicated by the applicant.
- e. In accordance with CAR 21.16B, DGCA may impose 'special condition(s)' in the 'certification basis' if it is considered that the selected 'airworthiness requirement' does not contain adequate safety standards for the product, or the product has novel/ unusual design features, etc.

4.3 Phase II – Agreement of the Certification Programme

The certification team discusses and agrees with the applicant on the certification programme which:

- (a) defines the proposed means of compliance with the type certification basis; and
- (b) describes all the activities and certification team's involvement with respect to compliance demonstrations, test witnessing, compliance tracking, compliance records, conformity statements, time schedule for achieving compliance, etc. All documents required to show compliance with the applicable requirements and their scheduled date of submission to AED, is identified in the Certification Programme for each subject. When defining the certification team's involvement, the applicant's Design Organisation Approval (DOA) privileges under CAR 21.A263 (b) is considered.

Whether all compliance documents are to be accepted without further verification or not by the certification team, is agreed upon with the applicant according to the scheduled level of involvement.

The PCM gives his concurrence with the agreed certification programme in writing.

4.4 Phase III – Compliance Determinations

The task of showing compliance with the certification basis is the responsibility of the applicant. The applicant :

- (a) defines the DGCA Type Design
- (b) submits a procedure to cover equipment qualification
- (c) submits a statement of conformity for certification tests
- (d) submits the required certification documents (including compliance reports, manuals, etc.) and
- (e) concludes each compliance report with a "Declaration of Compliance" with the applicable requirements.

The acceptance of the compliance demonstrations is the responsibility of the certification team.

4.5 Phase IV- Final Report and issue of a Type Certificate

4.5.1 Statement of Compliance

On completion of the certification programme the applicant shall provide a declaration of compliance (see CAR 21.20 (b)) that the type design of the product, to be type certificated, complies with the Type Certification Basis. The team members of the Certification team issue a statement (internal note) to DAED(Project Certification Manager) with the applicant's compliance declaration with respect to the discipline involved. On acceptance of all necessary statements by certification team, the DAED issues a compliance statement to the DDG, through an internal note, confirming that the type design of the product complies with the Type Certification Basis. The request of applicant for any exemption is examined by DAED. Safety considerations are taken in to account while granting such exemptions.

4.5.2 Final Certification Report

The DAED in conjunction with the Certification Team, submits a report to DDG, which includes type design of the product, the type investigation process, significant subjects investigated and details of that investigation, process followed and conclusions regarding compliance with the Type Certification Basis. The DAED submits this final report to the DDG for approval through an internal note.

4.5.3 Type Certificate / Restricted Type Certificate

After approval of final report, the DDG intimates the Director General (DG) by an internal note about successful closure of the technical investigation process. After taking consent of the DG, the DAED prepares TC/ RTC and Type Certificate Data Sheets (TCDS) to be signed by the JDG or DG and ensures that all necessary steps for closure of certification issues are performed. A Type Certificate Data Sheet becomes a part of the DGCA-TC/RTC.

4.6 Imported Products

4.6.1 General

For type certification of aeronautical products originating from an applicant whose principal place of business is located outside the territory of India, procedures other than those described above may apply depending on the content of bilateral agreements or working arrangements.

4.6.2 Type Certification under a formal agreement with the State of Design

In case of a Bilateral Aviation Safety Agreement (BASA) including the associated implementing procedures (IP), this agreement may supplement, change or supersede the above certification procedures. In this case, the DGCA certification may be called validation and it is assumed that the imported product meets the same level of confidence, a level of safety equivalent with an Indian product and comparable with a product designed and manufactured in India.

4.6.3 Type Certification under a working arrangement with the State of Design

In case of a working arrangement between DGCA and the competent civil aviation authority of the exporting country, the above certification procedures shall apply. However, based on

the working arrangement, the DAED may use the foreign certification system, if that has demonstrated the same level of independent checking function and compliance demonstration functions and correspond to DGCA certification basis defined under 4.2.2 of this part.

5 INTERFACE WITH OTHER ACTIVITIES

5.1 General

Co-ordination is required with a number of other activities. These activities include:

- (a) Aircraft/Engine/Propeller interactions
- (b) Equipment approval
- (c) Design Organisation Approval
- (d) Production Organisation Approval
- (e) Maintenance interactions and MRB Process
- (f) Operations interactions
- (g) Approval of test pilots

5.2 Aircraft/Engine/Propeller interactions

The applicant for an aircraft TC is responsible for installation of engine/propeller on the aircraft and has to show compliance with installation requirements that apply to, over and above, those required for separate type certification of engine/propeller. The engine/propeller manufacturer is expected to support the aircraft manufacturer in this process. The DGCA aircraft certification team examines interfaces between the relevant certification specifications/airworthiness codes.

5.3 Equipment Approval

For approval of equipment that is not to be certified as part of the product, obtaining an ITSO (Indian Technical Standard Order) Authorisation is the responsibility of the equipment manufacturer. The ITSO Authorisation is a recognition by DGCA that the equipment meets predefined qualification and performance criteria. However, the TC applicant is responsible for all interface aspects between equipment approval and product certification including showing of compliance of the equipment installed on his product with the Type Certification Basis. Approval of the equipment will be treated as a separate process for which appropriate procedures apply.

However, for the equipment for which ITSO authorization has not been issued, DGCA accepts the equipment manufactured under FAA TSO / ETSO authorisation.

5.4 Design and Production Organisation Approval

The DAED ensures appropriate communication with the responsible DOA/POA team leader in order to exchange any findings by the TC team which may affect the continuous validity of the organizational approvals of the applicant.

5.5 Maintenance interactions and MRB process

5.5.1 Maintenance interactions

In accordance with CAR-21.61 instructions for continued airworthiness shall be furnished by the applicant. These instructions normally comprises of the approved airworthiness limitation section containing Certification Maintenance Requirements (CMRs). Airworthiness limitations and CMRs are reviewed by the certification team to ensure compliance with the Type Certification Basis.

5.5.2 Maintenance Review Board (MRB) process

MRB is intended to provide an introduction to the maintenance review board (MRB) process used during the development of an initial maintenance program for newly certificated aircraft's initial minimum maintenance requirements. The primary purpose of the MRB process is to assist the design organization and the operator to establish an initial approved maintenance program for a new aircraft and the DGCA in approving that program. The MRB report becomes the basis for the first issue of an operator's initial maintenance program. Relaxations may be necessary to address operational or environmental conditions applicable to that operator.

Through operator's experience and with regulatory approval, additional changes to the maintenance program may be made by the operator in order to maintain a safe and efficient maintenance program. The AED and the Airworthiness Directorate of DGCA and aviation industry are involved in the process of developing an initial maintenance program for a newly type certificated aircraft

The DDG ensures appropriate representation on the MRB from the certification team.

5.6 Operation interactions

If the applicant requests to establish an operations evaluation board (OEB) the DDG informs the JDG / DG for setting up of an OEB. The JDG constitutes an OEB with appropriate representation covering AED, AID, Flight Inspection Directorate, Directorate of Training and Licensing and any other Directorate of DGCA as deemed necessary. The DDG ensures appropriate representation on the OEB from the certification team.

5.7 Approval of Test pilot for Prototype aircraft

The procedure for approval of test pilot for prototype aircraft is laid down in Advisory Circular number AC 01 of 2001. This Advisory Circular is available in Part 12 of the Handbook of Procedures.

6 ADDITIONAL PROVISIONS

6.1 Committees for Special Certification work

In certain areas of type certification work such as certification of electronic equipments, avionics, software and systems with unusual design features and having new technologies, DGCA does not have the experts to carry out certification work. In such cases DGCA constitute committee of experts from the relevant fields applicable to the work under consideration. The experts for such committees are taken from reputed Government organisation / public sector undertakings/ retired DGCA officers. DGCA enters into some working arrangement with the committee members. These committees are chaired by the DAED / DDG and the committee works according to the principle of type certification procedures of AED.

6.2 Resolution of disagreements

The Certification Team is the primary decision maker in the process under the supervision of its PCM. The Certification Team should have the ability and power to take the first decisions to the largest possible extent. If the certificate holder/applicant does not agree with the Certification Team's decision, the responsible DAED (PCM) will try to find a mutually acceptable solution. If an agreement still cannot be reached, the matter would be brought to the DDG to take a decision thereto.

If further deliberation is necessary then the final decision would be made by the DG. The applicant is informed about the final decision.

6.3 Interaction with Military Organisation.

6.3.1 General: Aircraft Engineering Directorate of DGCA interacts with Centre for Military Airworthiness and Certification (CEMILAC) as and when it is required during pre and post certification activities. Both DGCA and CEMILAC share data related to ground test, laboratory test, flight test, continued airworthiness and any other relevant information as deemed necessary. DGCA may accept some tests or analysis reports carried out by Design organisations for CEMILAC.

6.3.2 Data / records: DGCA shall keep record of major defects on such aeronautical products, which have been used in both civil and military operations. This data will help in analysis of defects and adopting mitigating strategies such as issuance of ADs etc.

6.4 Documentation

6.4.1 General

Some documentation, manuals or sections of manuals require formal DGCA approval. The DAED on behalf of DGCA, formally approves the documentation identified below, once these are reviewed and agreed by the appropriate certification team specialists.

6.4.2 Documents associated with Aircraft Type Certification

a) Aircraft Flight Manual

The Aircraft Flight Manual (AFM) is reviewed and should be agreed by the certification team. The team determines whether the limitations, operational procedures and performance contained in the AFM provides for safe operations and are compatible with the DGCA Type Design, and the DGCA Type Certification Basis.

b) Airworthiness Limitations Items and Certification Maintenance Requirements

The documents containing Airworthiness Limitations and Certification Maintenance Requirements arising from the certification process are reviewed and agreed by the DGCA certification team.

6.4.3 Documents associated with Engine and/or Propeller Type Certification

The Airworthiness Limitations sections, if given in one of the following documents, require formal approval:

- (a) Engine and/or Propeller Installation Drawing and Manual
- (b) Engine and/or Propeller Operating Instruction Manual
- (c) Engine and/or Maintenance and Overhaul Manual

6.4.4 Communication and Publication

Significant decisions affecting the result of the certification procedure are communicated by DDG to the applicant in writing. These decisions are related to issue, modification, limitation, suspension or revocation of certificates and are communicated to those concerned. The DDG takes necessary action, in order to make the relevant information circulated.

6.5 Confidentiality of Documents

All documents and information related to the certification procedure, submitted by Certificate holder/applicant, are kept in a safe place. If the applicants choose to submit the data required to support applications in electronic format, these data are also protected and kept safely.

6.6 Human factors principles:

The design of the aircraft, systems, instruments and equipment and performance schedule shall observe Human Factors principles. Guidance material on Human Factors principles can be found in the Human Factors Training Manual (Doc 9683) and in the Human Factors guidelines for Air Traffic Management (ATM) Systems (Doc 9758).

6.7 Interior design – security consideration:

For design of an airplane, consideration shall be given to design features that will deter easy concealment of weapons, explosives or other dangerous objects on board aircraft and that will facilitate search procedures for such objects.

7.0 Guidelines for issue of noise certificate for aircraft designed and manufactured in India:

7.1 The basis for noise certification of the aircraft designed and developed in India shall be in accordance with compliance with CAR 21.18 and ICAO Annex 16, Volume I or any such requirement stipulated by DGCA.

7.2 The noise certification for the aircraft designed and manufactured in India will be issued by DGCA (AED). Application received for issuance of a noise certificate is assessed which includes:

- (a) A statement of conformity issued by the authorized person who holds responsible position in manufacturing organization and countersigned by a DGCA

official showing compliance to the requirements of Annex 16 Volume I as amended from time to time or any such requirement stipulated by DGCA.

(b) The noise information is determined in accordance with the applicable noise requirements. This information shall be included in the flight manual, when a flight manual is required by the applicable airworthiness code for the particular aircraft.

7.3 The basis of noise certification includes the Type Certificate Data Sheet (TCDS) and the Airplane Flight Manual of the particular aircraft giving following details:

a) Information to be included in the Type Certificate Data Sheet (TCDS):

- Manufacturer and manufacturer's designation of aircraft.
- Engine manufacturer, type and model.
- Propeller Manufacturer, type and model for propeller-driven aeroplanes.
- Maximum take-off mass in kilograms
- Maximum landing mass, in kilograms, for certificates issued under Chapters 2, 3, 4, 5 and 12 of Annex 16 Volume I or any such requirement stipulated by DGCA.
- Additional modifications incorporated for the purpose of compliance with the applicable noise certification Standards.

Reference of the Chapter and Section of the Annex 16 Volume I, according to which the aircraft was certificated and corresponding noise levels.

b) Information to be included in the Airplane Flight Manual (AFM)

- Information as included in the TCDS
- Manufacturer's Serial Number of the aircraft
- The height above the runway at which thrust/power is reduced following full thrust/power take-off.

Note: A note shall be added stating that the "thrust/ power cutback height relates to the noise certification procedures and is not intended for use in normal operation".

8.0 Cancellation, Suspension or endorsement on type certificate.

Aircraft rule 49 D empowers DGCA that, if at any time, the DGCA is satisfied that there is a reasonable doubt to indicate that the safety of the aircraft is imperilled because of an unsafe condition in the aircraft, helicopter, engine, component or item of equipment of that aircraft/ helicopter, he may cancel, suspend or endorse the certificate issued or validated for the aircraft, helicopter, component or item of equipment of the aircraft/ helicopter or may require the incorporation of any modification as a condition of the Type Certificate remaining in force.

In addition, in determining compliance with the design aspects of the appropriate airworthiness requirements for an aircraft, DGCA shall take whatever other steps deemed necessary to ensure that the design approval is withheld if the aircraft is known or suspected to have dangerous features not specifically guarded against by those requirements.



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Handbook of Procedures
PART 2

Supplemental Type Certification Procedure (STCP)

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1 GENERAL

1.1 Introduction

This part of the handbook establishes the procedure for the approval of major changes to the type design under supplemental type certificate procedures(STCP), and establishes the rights and obligations of the applicants for, and holders of, those certificates. Any natural or legal person ('organisation') that has demonstrated, or is in the process of demonstrating, its capability under CAR 21.112B shall be eligible as an applicant for a supplemental type-certificate under the conditions laid down in this procedure.

1.2 Scope of Procedure

This procedure describes the process how DGCA handles the supplemental type certification of aeronautical products and how it issues Supplemental Type Certificates (STC). STC is issued for approval of a major change to an approved type design which is classified in accordance with CAR 21.91 and the designer of the major change is usually not the Type Certificate holder.

The supplemental type certification is performed in accordance with the provisions of CAR 21, Subpart E which lays down the requirements for the airworthiness and environmental certification of aircraft and related products, parts and appliances and the related Acceptable Means of Compliance ("AMC") and Guidance Material ("GM").

This procedure also includes the performance of supplemental type certification of major changes designed by an organization out side India and describes how DGCA handles the suspension, limitation or revocation of STCs according to the Aircraft Rules,1937 and CAR - 21.

1.3 Abbreviations / Terminology

AED	Aircraft Engineering Directorate
AID	Aircraft Inspection Division (Airworthiness Directorate)
AMC	Acceptable Means of Compliance
AFM	Aircraft Flight Manual
CAR	Civil Aviation Requirements
CM	Certification Manager
CMR	Certification Maintenance Requirements
CRI	Certification Review Item
CS	Certification Specification (Airworthiness Code)
DOA	Design Organisation Approval
DAED	Director, Aircraft Engineering Directorate
DDG	Deputy Director General in-charge of AED (for the purpose of this document only)
DG	Director General
DGCA	Directorate General of Civil Aviation
EA	Exporting Authority
EASA	European Aviation Safety Agency

ESF	Equivalent Safety Finding
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
GM	Guidance Material
ITSO	Indian Technical Standard Order
ICAO	International Civil Aviation Organisation
JDG	Joint Director General
MMEL	Master Minimum Equipment List
MRB	Maintenance Review Board
OEB	Operations Evaluation Board
PCM	Project Certification Manager
POA	Production Organisation Approval
SC	Special Condition
STC	Supplemental Type Certificate
TC	Type Certificate
TCP	Type Certification Procedure

1.4 References

- a) The Aircraft Rules, 1937.
- b) CAR-21 , AMC and GM.

2. APPLICATION AND ALLOCATION OF TECHNICAL INVESTIGATION TASKS

General technical investigation procedures are described in this paragraph. These procedures specify the interfaces between various groups of AED of DGCA and the Design Organisations.

2.1 Acceptance of Application

Applications for a DGCA Supplemental Type Certificate is sent to the DAED in DGCA form “CA 33” prescribed in CAR 21 and made in accordance with CAR 21.113. The fees should be paid by applicant to DGCA after receipt of preliminary acceptance letter from AED.

If any incorrect or incomplete information is provided, the DAED informs the applicant as soon as possible mentioning the omissions and errors. After receipt of correct and complete application, the DAED immediately assigns a project / file number, for example, xx- xx/ year- AED, to the application with preliminary approval number and date. DAED ensures that all relevant data in the applications/approval database are updated. For any technical issue, the DAED consults with the DDG.

After receiving the correct and complete application, the DAED, acknowledges the receipt of the application as soon as possible. The DAED, in consultation with the DDG, makes eligibility checks according to CAR-21 and determines how the application will be

processed and what are the applicable requirements within one month of receipt of complete application.

When eligibility has been fully assessed the applicant receives a letter of acceptance of the proposal from AED. The DAED updates the DGCA approvals database with all the relevant information and inform the following to the applicant in writing, with a copy to regional office if applicable:

- (a) whether the application is accepted or not. If not, the reason there to,
- (b) project / file number (e.g.: xx / xx- year-AED)
- (c) the DGCA certification team that will perform the technical investigation. If it has not been decided yet, the DAED will intimate the applicant the projected time frame. This intimation follows as soon as possible, after the selection of the DGCA- certification team.
- (d) the fees payable in accordance with the applicable fees & charges laid down in the Aircraft Rules, 1937 and CAR 21.

After receipt of fees DAED updates the database of AED and the process of STC starts.

In order to streamline the process and to be time-efficient, any of the above communication steps can be merged as soon as the necessary information is available.

In case of refusal of an application, the DAED intimates his decision in writing to the applicant together with the reasons thereto instead of a letter of acceptance.

2.2 Allocation of technical investigations tasks

After eligibility has been fully assessed and once in-principle acceptance is given, the DDG constitutes an appropriate DGCA certification team (see 3.2) of AED officers headed by the DAED. Officers from other Directorates of DGCA are also co-opted as team members depending on the complexity of certification work. The DAED is allocated with the responsibilities of Project Certification Manager (PCM).

2.2.1 Reserved

2.2.2 Reserved

3 CERTIFICATION TEAM

3.1 General

The DGCA certification process for a Supplemental Type Certification of a change to an approved type design is performed by a team of specialists, led by the DAED(PCM). The DAED reports to the DDG on progress of the work.

3.2 Determination of the Certification Team

The applicant, if deemed necessary by the DDG, organises a presentation on general familiarisation of the project. This presentation takes place at a convenient location. The

attendance at the initial presentation normally includes AED officers and the officers from other Directorates of DGCA, if deemed necessary. A presentation on “DGCA-Supplemental Type Certification Procedure” is given to the applicant, if the applicant is not familiar with the procedures.

After the general familiarisation, the DDG, depending on the category of the product and complexity of the project, appoints a certification team led by a DAED (PCM), consisting of Deputy Directors, Senior Scientific Officers, Scientific Officers and Junior Scientific Officers of AED. Officers from other Directorate of DGCA may be included in the certification team depending on the complexity of certification project.

The composition and size of certification teams can vary and is dependant on change which needs to be type certificated. Where the extent of the investigation does not justify the need for a team, one person may perform the investigation.

A certification team for “significant changes” (see 4.2) of large transport aircraft, for example, may need more specialists covering the disciplines of:

Flight Test Pilot, Flight Test Engineer, Performance, Structures, Powerplant installation, Fuel systems, Hydro-mechanical systems, Electrical systems, Avionic systems, Transmissions, Electronic Controls & Software, Cabin safety, Environmental Control systems & Icing, Noise & Environmental protection.

The team involved in the certification are normally assigned the task of the continuing airworthiness of concerned product. However, the team size and members depend on the complexity of the project.

3.3 Management of Certification Teams

The DEAD aims to ensure equal treatment of applicants across certification projects by monitoring, coordination and management. For this, the DDG organises regular coordination meetings with the DAED, in order to achieve the administrative and technical standardisation across certification projects. Technical training is provided on a regular basis to the officers of AED with-in and outside the country.

4 CERTIFICATION PROCEDURES

4.1 Principles

Once an application has been accepted and a certification team is established, the DGCA supplemental type certification process can generally be divided in to the following phases.

Phase I – Technical Familiarisation and establishment of the Supplemental Type Certification Basis

The objective of this phase is to provide technical information about the project to the team specialists to enable the definition of the project and the agreement on the DGCA Supplemental Type Certification Basis.

Phase II – Agreement of the Certification Programme

The objective of this phase is to agree on the proposed means of compliance with the Certification Basis and the identification of the team involvement.

Phase III – Compliance determinations

The objective of this phase is to agree on demonstration of compliance with the Certification Basis and acceptance of the compliance demonstration.

Phase IV- Final Report and issue of a Supplemental Type Certificate

The objective of this phase is to establish and justify the compliance demonstration with respect to design requirements, type investigation and, based on approval of the final report by the DDG, the issue of the DGCA-Supplemental Type Certificate..

4.2 Classification of Changes

Changes to an approved type design which will result in STCs are divided into two categories:

‘Significant’: A significant change is a product-level major change and results from either an accumulation of changes or an isolated extensive change of the product which makes the product distinct from others. It is classified in accordance with CAR 21.101(b)(1) (i) and/or (ii).

‘Non-significant’: A ‘non-significant’ change is a product-level major change classified in accordance with CAR 21.91 that does not come with the criteria that defines a significant change (see CAR 21.101(b)).

The classification of ‘significant’ and ‘non-significant’ changes shall be made by DGCA in one of the following two ways:

(a) by agreeing to appropriate controls and procedures that enable the applicant to make a declaration that a change is ‘non-significant’. An appropriate declaration by the applicant to DGCA may be acceptable for this purpose. In all cases, the DGCA retains the option to be involved and decide.

(b) by accepting the determination of significance of a major change, based on the applicant’s submission.

4.3 Phase I - Technical familiarisation and establishment of the STC Basis

4.3.1 Technical familiarisation

For ‘significant’ changes the certification team needs to receive thorough technical briefings from the applicant about the product in order to fully understand the design, including new used technologies and any unique or unconventional features or intended unconventional usage of the product. Those technical information about design features, which can not be addressed by the usual applicable certification specification/ airworthiness standard/design code, and might affect the establishment of the DGCA Type Supplemental Certification Basis are included as Special Conditions.

For ‘non-significant’ changes the technical briefings from the applicant are examined accordingly.

4.3.2 Establishment of the initial Supplemental Type Certification Basis

For ‘non-significant’ changes, the certification basis is the original Type Certification basis of the applicable product, except when the applicant elects to comply with a later amendment.

For ‘significant’ changes, the DAED(PCM), supported by his certification team, drafts the initial Supplemental Type Certification Basis which consists of applicable certification specifications /airworthiness code/ design codes at the date of application and includes, if applicable, deviations/ limitations and environmental protection requirements.

Special Conditions, where properly justified, may also form part of the Supplemental Type Certification Basis. The applicant may also elect to comply with a later amendment of the applicable certification specifications which will then become part of the Supplemental Type Certification Basis.

New Special Conditions, if considered important by the DDG shall be stipulated. The DDG approves the initial Supplemental Type Certification Basis and any changes to it, based on the draft prepared by the DAED.

The initial Supplemental Type Certification Basis may need to be changed along the course of the certification process due to new applied technologies, introduction of design changes, discovery of unsafe conditions or compliance demonstration results. The process for such changes is the same as for the establishment of the initial certification basis.

4.3.3 Recording of the Supplemental Type Certification Basis

If the DGCA Supplemental Type Certification Basis is different from the original DGCA Type Certification basis of the applicable product, then the DAED records it in a document called Certification Review Item (CRI).

In such cases, each Special Condition, Exemption, Equivalent Safety Findings or useful interpretation and alternative means of compliance are presented in detail in a separate CRI.

4.3.4 Intimation on CRI

The PCM intimates the applicant about CRI after examination of the document

4.3.5 Acceptable Airworthiness Design Codes

- a. According to CAR 21.17(a), applicable FAA/ EASA design codes for aeronautical products are to be proposed by the applicant.
- b. Suitable environmental (emission and noise) protection requirements in line with CAR 21.18(a)&(b). Also, subpart I of CAR 21 prescribes procedure for issue of ‘Noise certificate’, if applicable.
- c. In accordance with CAR 21.16B, DGCA may impose ‘special condition(s)’ in the ‘certification basis’ if it is considered that the selected ‘airworthiness requirement’ do not contain adequate safety standards for the product, or the product has novel/ unusual design features, usage etc.

4.4 Phase II - Agreement of the Certification Programme

Based on the proposal of applicant, the certification team discusses and agrees with the applicant's certification programme which:

- (a) defines the proposed means of compliance with the supplemental type certification basis ; and
- (b) describes all the activities and team involvement with respect to compliance demonstrations, test witnessing, compliance tracking, compliance records, conformity statements, time schedule for achieving compliance, etc.

All documents required for showing compliance with the applicable requirements and their scheduled date of availability are identified by the applicant in the Certification Programme for each subject.

While defining the certification team's involvement, the applicant's Design Organisation Approval (DOA) privileges under CAR 21.A263 (b) is considered. Whether all compliance documents are to be accepted, without any further verification or not, by the certification team should be agreed upon with the applicant according to the scheduled level of involvement.

The DAED approves the agreed certification programme and intimates the applicant in writing.

4.5 Phase III – Compliance Determinations

The task of showing compliance with the certification basis is the responsibility of the applicant. The applicant :

- (a) defines the DGCA -Type Design
- (b) submits a procedure to cover equipment qualification;
- (c) submits a statement of conformity for certification tests;
- (d) submits the required certification documents (including compliance reports, manuals, etc.);
- (e) concludes each compliance report with a Declaration of Compliance with the applicable requirements.

The acceptance of the compliance demonstrations is the responsibility of the DAED, supported by his certification team.

4.6 Phase IV- Final Report and issue of Supplemental Type Certificate

4.6.1 Statement of Compliance

On completion of the certification programme the applicant provides a declaration of compliance (see CAR 21.114) that the type design of the changed product which is to be certificated complies with the Supplemental Type Certification Basis.

The Team members submit their observation to the DAED with the applicant's compliance declaration of the discipline involved.

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On acceptance of all necessary statements of satisfaction by the certification team, the DAED issues a compliance statement to the DDG confirming that the type design of the changed product complies with the Supplemental Type Certification Basis.

4.6.2 Final Certification Report

For 'significant' changes, the DAED, in conjunction with his team, submits a report, which covers the Type Design on which the type investigation process is based, significant subjects investigated, details of that investigation, process followed and conclusions regarding compliance with the Supplemental Type Certification Basis. The DAED submits the final report in the form of an internal note to the DDG for approval.

For 'non-significant' changes also DAED submits an internal note to DDG for approval. After approval of DDG, DAED takes necessary action for formal closure of the technical investigation.

4.6.3 Issuance of the Supplemental Type Certificate

After approval of final report, the DDG intimates the Director General (DG) through an internal note about successful closure of the technical investigation process. The DAED then prepares the STC and Type Certificate Data Sheets (if applicable) to be signed by the JDG or DG., and ensures all necessary steps to close the project. A Type Certificate Data Sheet becomes a part of the DGCA- STC.

4.6.4 STC for a product with FAA/EASA Type design

For issue of a DGCA-STC for a product with FAA/EASA Type design, the applicant should inform the TC holder, manufacturer and Civil Aviation Authority of the state of design under intimation to AED, DGCA. The procedure laid down in this handbook is applicable for such products.

4.7 Changes to a Supplemental Type Certificate

In accordance with CAR 21.117(a), the procedure for approval of minor changes to part of a product covered by a STC shall follow CAR 21, Subpart D and the Handbook of Procedures for TC changes.

In accordance with CAR 21.117(b), the approval of major changes to the part of a product covered by a STC shall be carried out within the framework of this STC procedure following CAR 21, Subpart E and approved as a separate STC.

In accordance with CAR 21.117(c), the approval of major changes to the part of a product covered by a STC submitted by the STC holder itself may be approved following this procedure as changes to the existing STC.

4.8 STC application from a foreign country

4.8.1 General

For supplemental type certification of changes originating from applicants whose principal place of business is located outside the territory of India, procedures other than those

described above may apply depending on the content of bilateral agreements or working arrangements.

When an application has been made within the framework of a bilateral agreement, the DGCA may accept classification of changes by the foreign applicant. In this case the DDG confirms that the application is in accordance with bilateral agreements. Certification procedure shall be as per the provisions of bilateral agreement.

4.8.2 Supplemental Type Certification under a formal bilateral agreement with the State of Change Design

In case of a formal recognition agreement between the aviation authority of State of change design and DGCA including the associated implementing procedures, the implementation procedures for change of product supersede the above supplemental type certification procedures.

In this case, the DGCA certification may be called validation and it is assumed that the major change designed by a foreign applicant meets the same level of confidence and a level of safety equivalent to that required for comparison with a major change product, designed and manufactured within India.

4.8.3 Supplemental Type Certification under a working arrangement with the State of Change Design

In case of a working arrangement between DGCA and the civil aviation authority of state of change design, above supplemental type certification procedures is applicable. However, based on the working arrangement, the DAED may use the foreign certification system, which has demonstrated the same level of independent checking function, and compliance determination functions and correspond to the DGCA certification basis prescribed in 4.3.2 of this part.

5 INTERFACE WITH OTHER ACTIVITIES

5.1 General

Co-ordination is required with a number of other activities. These activities include:

- (a) Aircraft/Engine/Propeller interactions
- (b) Equipment approval
- (c) Design Organisation approval
- (d) Production Organisation approval
- (e) Maintenance interactions
- (f) Operations interactions

5.2 Aircraft/Engine/Propeller interactions

In cases where the change covers alternative engine or propeller for the aircraft, then the STC applicant is responsible for installation of engine/propeller on the aircraft and has to show compliance with installation requirements that apply to, over and above, those required

for a separate type certification of engine/propeller. The engine/propeller manufacturer is expected to support the STC applicant in this process.

The certification team examines the potential interfaces between the relevant certification specifications/ airworthiness code and ensures proper interface communication.

5.3 Equipment Approval

For approval of new or alternative equipment that is not to be certified as part of the product, obtaining Indian Technical Standard Order (ITSO) Authorisation is responsibility of the equipment manufacturer. ITSO Authorisation is the recognition by DGCA that the equipment meets predefined qualification and performance criteria. However, the STC applicant is responsible for all interface aspects between equipment approval and product certification including showing of compliance of the equipment installed on his product with the Supplemental Type Certification Basis.

However, for the equipment for which ITSO authorization has not been issued, DGCA accepts the equipment manufactured under FAA TSO / ETSO authorisation.

5.4 Design and Production Organisation Approval

The DAED ensures appropriate communication with the responsible DOA/POA team leader in order to exchange any findings by the STC team which may affect the continuous validity of the organisational approvals of the applicant.

5.5 Maintenance interactions

As required by CAR-21.120 and in accordance with the provisions of the applicable design airworthiness codes, specifications and instructions for continued airworthiness are furnished by the applicant. Certification Maintenance Requirements (CMRs) and Airworthiness Limitations arising there, are reviewed by the certification team to ensure compliance with the Supplemental Type Certification Basis.

5.6 Operation interactions

If the applicant requests to establish an operations evaluation board (OEB), the DDG proposes for setting up of an OEB to JDG/DG. The JDG/DG would constitute an OEB with appropriate representation covering AED, AID, Flight Inspection Directorate, Directorate of Training and Licensing and any other Directorate of DGCA, as deemed necessary. The DDG ensures appropriate representation on the OEB from the certification team.

6 ADDITIONAL PROVISIONS

6.1 Panel of Experts

6.1 Committees for Special Certification work

In certain areas of supplemental type certification work such as certification of electronic equipment, avionics, software and systems with unusual design features and having new technologies, DGCA does not have the technical experts to carry out certification work. In such cases, DGCA0 constitutes committee of experts from the relevant fields and applicable to the work under consideration. The experts for such committees are taken from reputed

Government organisation / public sector undertakings/ retired DGCA officers / industry. DGCA enters in to a working arrangement with the external committee members. These committee is chaired by DAED/ DDG and the committees work according to the principle of supplemental type certification procedure of AED. DAED is responsible for the entire certification work.

6.2 Resolution of Disagreements

The Certification Team is the primary decision maker in the process under the supervision of the DAED(PCM). The Certification Team should have the ability and power to take the first decisions to the largest possible extent. If the Certificate holder/applicant does not agree with the Certification Team's decision, the responsible DAED (PCM) will try to find a mutually acceptable solution. If an agreement still cannot be reached, the matter will be brought to DDG to take a decision thereto.

If further deliberation is necessary, then the final decision will be made by the DG. The applicant is informed about the final decision.

6.3 Reserved

6.4 Suspension, limitation and revocation of a certificate

Based on sound justification provided by the DDG , the JDG / DG may decide to limit, suspend or revoke a STC as per the Aircraft Rules, 1937 and CAR 21.

When a certificate or a subsequent approval to a certificate is suspended, limited or revoked, on behalf of JDG/ DG, the DDG intimates the holder of the STC of his decision and the reasons thereto.

6.5 Documentation

6.5.1 General

Some documentation, manuals or sections of manuals require formal DGCA approval. The relevant documents, which are found acceptable by the DAED, are referenced in STC, including number and revision status, and deemed to be approved as integral part of the DGCA- STC.

6.5.2 Documents associated with Aircraft Type Certification

(a) Aircraft Flight Manual

If the change leading to a STC affects the Aircraft Flight Manual (AFM), an AFM amendment is reviewed and agreed by the certification team.

In such cases, the team determines whether the limitations, operational procedures and performance contained in the AFM amendment provides for safe operations and are in accordance with the original Type Design, and the DGCA Supplemental Type Certification Basis.

(b) Airworthiness Limitations Items and Certification Maintenance Requirements

The documents containing Airworthiness Limitations and Certification Maintenance Requirements arising from the certification process are reviewed and agreed by the DGCA certification team.

6.5.3 Communication and Publication

Significant decisions affecting the result of the certification procedure are communicated by DDG to the applicant in writing. These decisions are related to issuing, modification, limitation, suspension or revocation of certificates are communicated to those concerned. The DDG makes provisions, in order to make the relevant information circulated.

6.6 Confidentiality of Documents

All documents and information received are retained by DGCA which are related to the certification procedure and originates from the Supplemental Certificate holder/applicant or a third party. If the applicant choose to submit data required to support applications in electronic format , then also , these data are protected and kept safely.



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Handbook of Procedures
PART 3

TYPE CERTIFICATE CHANGE AND REPAIR APPROVAL
PROCEDURE

CONTENTS

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1.0 Purpose :

This procedure defines the Type certificate change and repair approval process as well as the approval process for stand-alone or minor changes related to revision of flight manual.

2.0 Scope ;

This procedure applies to approval of Type certificate changes, Flight Manual changes and repair design data approval when the applicant is the TC holder. This procedure is also applicable for minor changes to TC, when the applicant is not the TC holder. In accordance with CAR 21.117(a), this procedure is also applicable to approval of minor changes to the part of the product covered by a STC. In accordance with CAR 21.117(b) and (c), This procedure is not applicable to major changes to part of a product covered by a STC irrespective of the applicant whether the STC holder himself or any applicant. Further, this procedure is not applicable to RTC and ITSO authorisation holder.

3.0 Documents referred

1. CAR 21
2. AMC and GM of CAR 21
3. ICAO Doc 9760.

4.0 Basic Principles

a) Changes :

According to CAR 21.91 changes in type design are classified as major or minor. A change which does not have any appreciable effect on mass, balance, structure, strength, reliability, operational characteristics, noise, fuel venting, exhaust emission or any other characteristics effecting the airworthiness of the product is called minor change. The minor changes are not significant change. The changes which are not minor are called major.

b) Repair :

The approval of design data of repairs follows the same principles as for the approval of changes. However, in this case the requirements of CAR 21.101 does not apply. Qualification, production and release of repair parts shall follow respective provisions of CAR 21.

c) Flight Manual Changes :

Changes of Flight Manual (FM) with out a technical change of aircraft is called Stand-alone FM change. AED approves such changes.

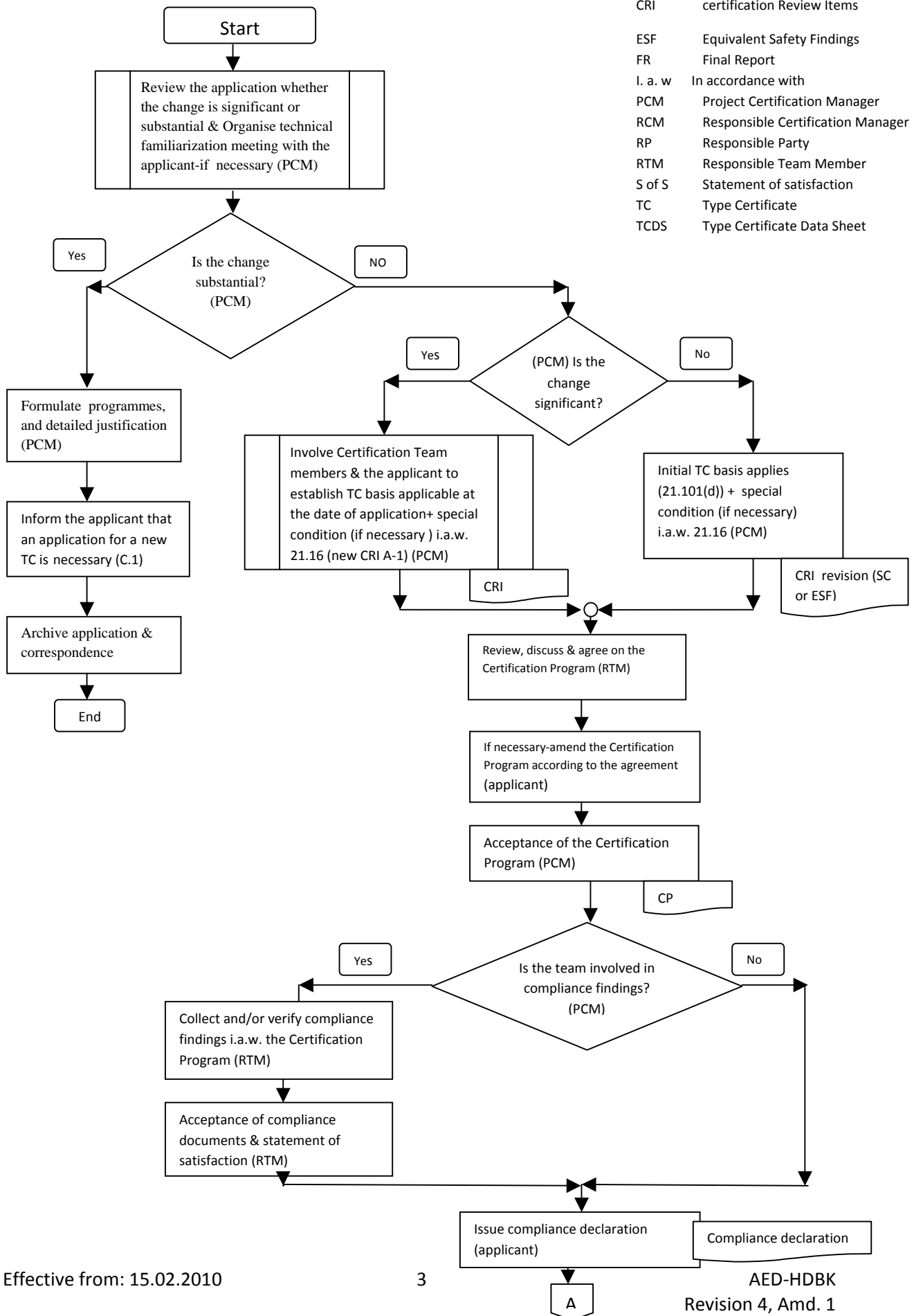
Approval of a change to FM or its supplements in relation to a major technical change or STC is included in the technical design change. The design change approval would automatically approve the FM changes.

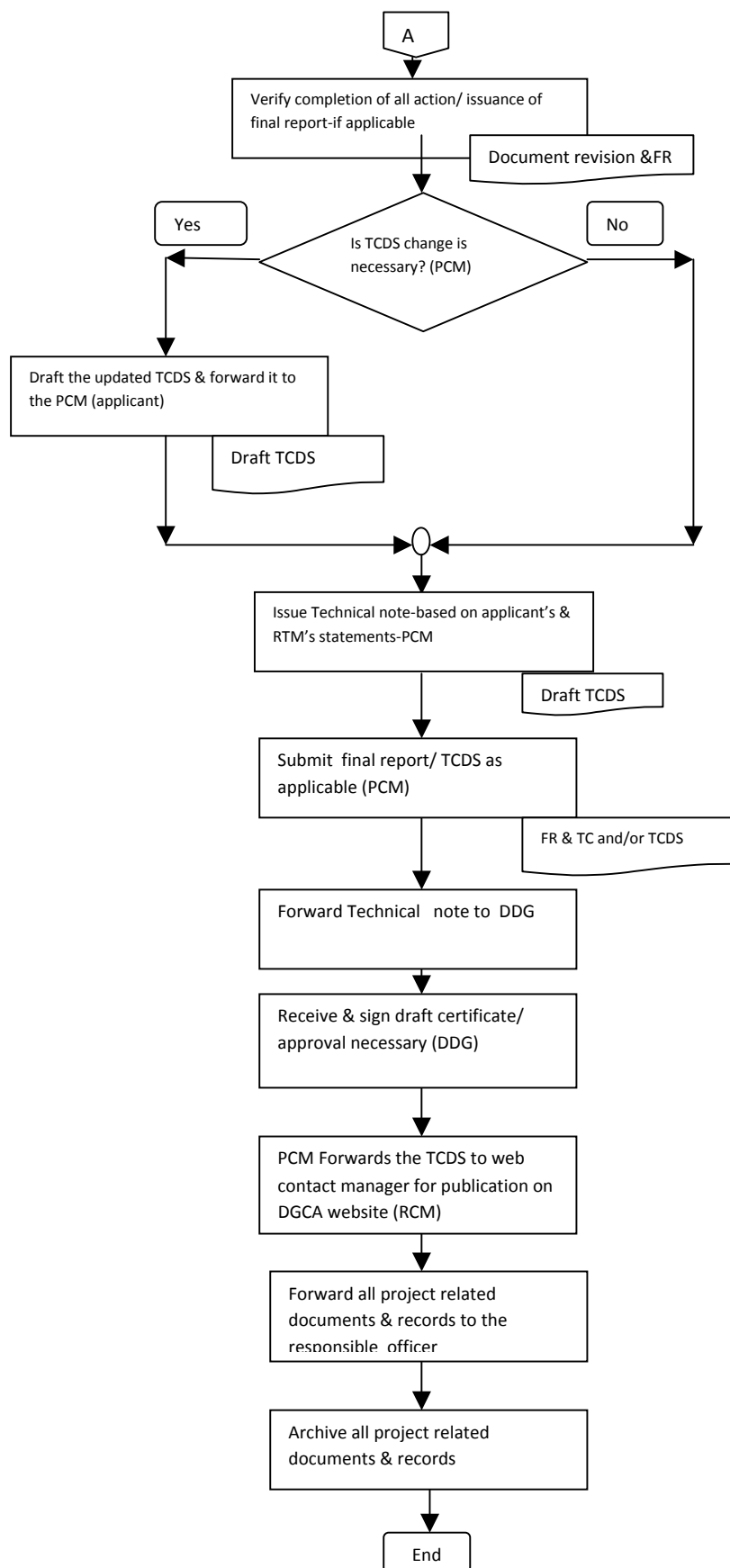
5.0 Procedure :

The structure of the procedure reflects the classification of changes and repair as major and minor. The procedure for major change and minor changes are described separately using two flow charts. The minor changes, minor repairs and stand alone FM change are grouped in one flow chart.

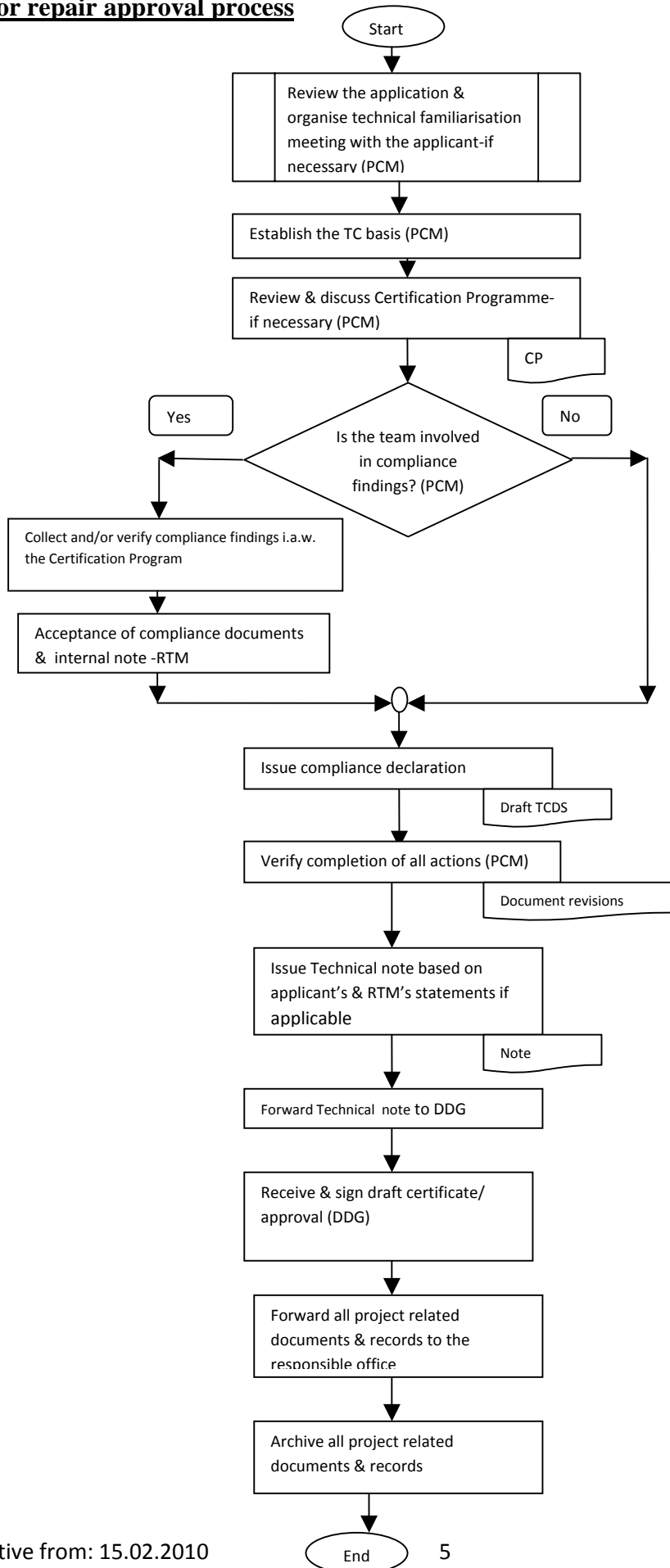
5.1 Flow Charts **Major change approval process**

CP	Certification Programme
CRI	certification Review Items
ESF	Equivalent Safety Findings
FR	Final Report
I. a. w	In accordance with
PCM	Project Certification Manager
RCM	Responsible Certification Manager
RP	Responsible Party
RTM	Responsible Team Member
S of S	Statement of satisfaction
TC	Type Certificate
TCDS	Type Certificate Data Sheet





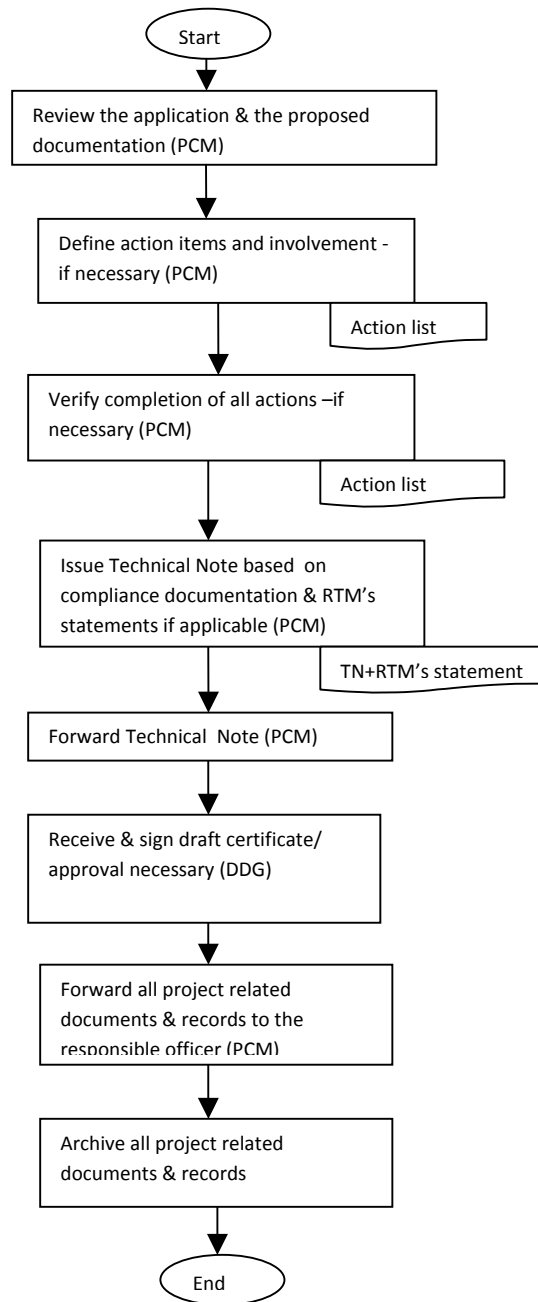
Major repair approval process



CP Certification Programme
 ESF Equivalent Safety Findings
 RP Responsible Party
 RTM Responsible Team Member

Minor change/repair & AFM stand-alone changes

RP Responsible Party
RTM Responsible Team Member
TN Technical Note



6.0 Description of Repair/ Modification

6.1 **INTRODUCTION** : There are two type of repairs, viz., (a) Major repair, and (b) Minor repair. In the following pages, all relevant details in respect of major and minor repairs and guidance material of the same have been described.

6.2 REPAIRS :

6.2.1 Major repairs :

The DGCA should advise the industry maintenance personnel and aircraft owners and operators regarding the classification of major/ minor repairs. Major repairs are classified into two categories:

- a. those which conform to data previously approved by the DGCA; and
- b. those which require additional evaluation by the DGCA.

Those in category (b) must be investigated to the extent necessary to determine that they meet the requirements of the applicable DGCA regulations.

Typical major repairs are listed below :

- a) Airframe major repairs. Repairs to the following parts of an airframe and repairs of the following types, involving the strengthening, reinforcing, splicing and manufacturing of primary structural members or their replacement is by fabrication such as riveting, bonding or welding, are airframe major repairs:
 - 1) box beams;
 - 2) honeycomb panels;
 - 3) monocoque or semi-monocoque wings or control surfaces;
 - 4) wings skins, stringers or chord members;
 - 5) spars;
 - 6) pressure bulkheads, doors, hatches and windows;
 - 7) spars flanges;
 - 8) members of truss-type beam;
 - 9) thin sheet webs of beams;
 - 10) keel and chine members of boat hulls, or floats;
 - 11) corrugated sheet compression members which act as material of wings or tail surfaces;
 - 12) wing main ribs and compression members;
 - 13) engine pylons;
 - 14) engine mounts;
 - 15) fuselage longerons;
 - 16) members of the side truss, horizontal truss or bulkheads;
 - 17) main sheet support braces and brackets;
 - 18) landing gear brace struts;

- 19) axles;
 - 20) wheels;
 - 21) skis and ski pedestals;
 - 22) parts of the control system such as control columns, pedals, shafts, brackets or horns;
 - 23) repairs involving the substitution of material;
 - 24) the repair of portions of skin sheets by making additional seam;
 - 25) the splicing of skin sheets;
 - 26) the repair of three or more adjacent wing or control surface ribs or the landing edge of wings and control surfaces between such adjacent ribs;
 - 27) repair of fabric covering involving an area greater than that required to repair two adjacent ribs;
 - 28) replacement of fabric on fabric covered parts such as wings, fuselage, stabilizers and control
 - 29) repairing of removable, or integral fuel tanks and oil tanks.
- b) Power-plant major repairs. Repairs of the following parts of an engine and repairs of the following types are power-plant major repairs.
- 1) removal, repair and replacement of:
 - fan and shaft
 - fan thrust bearing
 - intermediate pressure and low pressure turbines
 - intermediate or high pressure compressors
 - combustor lever
 - 2) separation or disassembly of a crankcase or crankshaft of a reciprocating engine equipped with an integral supercharger;
 - 3) separation or disassembly of a crankcase or crankshaft of a reciprocating engine equipped other than spur-type propeller reduction gearing
 - 4) removal, repair or replacement of external gear box; and
 - 5) special repairs to structural engine parts by welding, plating, metalizing or other methods.
- c) propeller major repairs. Repairs of the following types to a propeller are propeller major repairs:
- 1) any repairs to or straightening of steel blades
 - 2) repairing or machining of steel hubs;
 - 3) shortening of blades ;
 - 4) repair to wood or composition blades;
 - 5) repair of propeller governors;
 - 6) overhaul of controllable pitch propellers;

- 7) repair to deep dents, cuts, scars, nicks, etc., strengthening of aluminium blades; and
 - 8) the repair or replacement of internal elements of blades.
- d) Equipment major repairs. Repair of the following types to equipment are considered major repairs:
- 1) repair and calibration of flight and navigation system instruments and equipment;
 - 2) complete disassembly of complex hydraulic and pneumatic power valves;
 - 3) overhaul of pressure type carburetors and pressure type fuel, oil and hydraulic pumps; and
 - 4) overhaul of fuel control systems

6.2. 2. Minor repairs:

Any other repair than those mentioned above are considered to be minor repairs. The Type Certificate holder of an aircraft has a privilege in accordance with CAR 21. A263(b)(2) to approve minor changes to type design.

6.3 MODIFICATION/ RETRO FITMENTS :

6.3.1 Major modification/ retro fitments :

Description of major Modification/ Retro fitments :

"Major Modification/ Retro fitments" consist of an Modification/ Retro fitment :

i) that might appreciably affect :

- 1) structural strength;
- 2) performance or flight characteristics;
- 3) modification of systems;
- 4) power plant or propeller operation limitations;
- 5) weight and balance(centre of gravity) location.

ii) that is not accomplished according to accepted practices or cannot be accomplished by elementary operations.

6.3.2. Typical major Modification/ Retro fitments are listed below :

a) Airframe major Modification/ Retro fitments

Modification/ Retro fitments of the following parts / types, when listed in the aircraft specifications, are generally classified as airframe major Modification/ Retro fitments:

- 1) wings;
- 2) empennage;
- 3) fuselage;
- 4) engine pylons;

- 5) flight control systems;
 - 6) landing gear;
 - 7) hull or floats;
 - 8) elements of an airframe including spars, ribs, fittings, shock absorbers, bracing, cowling, fairings and balance mass;
 - 9) rotor blades;
 - 10) changes to the empty mass or empty balance which result in an increase in the maximum certificated mass or centre of gravity limits of the aircraft;
 - 11) changes to the basic design of the:
 - fire protection system
 - avionics flight control system
 - electrical power system
 - environmental system
 - fuel system
 - pneumatic system
 - water and waste system
 - oxygen system
 - ice and rain protection system
 - 12) auxiliary power unit;
 - 13) changes to the wing or to fixed or movable control surfaces which affect flutter and vibration characteristics.
- b) propulsion system major Modification/ Retro fitments

The following Modification/ Retro fitments of a power plant, when not listed in the engine specifications, are power plant major Modification/ Retro fitments;

- 1) conversion of an aircraft engine from one approved model to another, involving any changes in compression ratio, propeller reduction gear, impeller gear ratios number of working stages, number of rotating airfoils, stators or the substitution of major engine parts which require extensive rework and testing of the engine;
- 2) changes to the engine by replacing aircraft engine structural parts with parts not supplied by the original manufacturer or parts not specifically approved by the CAA;
- 3) installation of an accessory which is not approved for the engine;
- 4) removal of accessories that are listed as required equipment on the aircraft or engine specification;
- 5) installation of structural parts other than the type of parts approved for the installation; and
- 6) conversions of any sort for the purpose of using fuel of a rating or grade other than that listed in the engine specifications.

c) propeller major Modification/ Retro fitments

The following Modification/ Retro fitments of a propeller when not authorized in the propeller specifications are propeller major Modification/ Retro fitments :

- 1) changes in blade design;
- 2) changes in hub design;
- 3) changes in governor or control design;
- 4) installation of a propeller governor feathering systems;
- 5) installation of propeller de-icing system; and
- 6) installation of parts not approved for the propeller.

d) Equipment major Modification/ Retro fitment

Modification/ Retro fitments of the basic design not made in accordance with DGCA Airworthiness Directives are equipment major Modification/ Retro fitments. In addition, changes in the basic design of communication and navigation systems, flight management systems approved under type certification or DGCA approved specifications that have an affect on the performance of the equipment are also major Modification/ Retro fitments.

6.3.3 Modification/ Retro fitments which require engineering approval

Many Modification/ Retro fitments that are commonly called major Modification/ Retro fitments are in reality major design changes and require a supplemental type certificate. Major changes to the type design are those which might appreciably affect mass, balance, structural strength, reliability, operational characteristics, or other characteristics affecting the airworthiness of the product. Modification/ Retro fitments of this require engineering approval and should be referred to the AED. Typical major Modification/ Retro fitments in this category are listed below:

- a) increase in gross mass and/or changes in the centre of gravity (cg) range;
- b) installation or relocation of equipment and systems or changes which may adversely affect structural integrity, flight or ground handling characteristics of the aircraft. For example engine, engine pylons, auxiliary power units, propellers of a different make or model; pressurization systems; alternate static air or pressure systems; initial or prototype installation of an automatic flight control system which changes servo forces, servo rates or any flight control or performance characteristics; and the relocation or changes of throttle levers, flap controls and similar items;
- c) any change (Modification/ Retro fitment) of movable control surfaces which may affect flight characteristics or performance or make difference (plus or minus) in the mass distribution;
- d) change in control surface travel outside approved limits, control system mechanical advantage, location of control system component parts, or direction of motion of controls;

- e) changes in basic dimensions or external configuration of the aircraft, such as wing and empennage plan form or incidence angles, canopy, cowlings, contour or radii or location of wing and tail fairing, engine pylons, etc.;
- f) changes to landing gear, such as internal parts of shock struts, length, geometry of members or brakes and brake systems and wheels;
- g) any change to engine pylons, cowling and /or baffling which may adversely affect the flow of cooling air and changes to manifold;
- h) changes to primary structures which may adversely affect strength or flutter and vibration characteristics;
- i) changes to systems which may adversely affect aircraft airworthiness such as relocation of exterior fuel vents, use of hydraulic components, tube material and fittings not previously approved or use of new type fusible hydraulic plugs;
- j) changes to oil and fuel lines or systems which may adversely affect their operations, such as new type of hose and hose fittings, change in fuel dump valves, new fuel cell sealants, new fuel or line materials and new fuel or oil system components;
- k) any changes to the basic engine or propeller design controls or operating limitations and unapproved changes to engine adjustments and settings having an affect on power output;
- l) changes in a fixed fire extinguisher or detector system which may adversely affect the system effectiveness or reliability, such as relocation of discharge nozzle or detector units, use of new or different detector components in new circuit arrangements; deletion of detector units or discharge nozzles; extinguishing agent or decrease in amount of extinguishing agent;
- m) changes which do not conform to the minimum standards established in a DGCA approval under which a particular aircraft component or equipment is manufactured;
- n) modifications to approved type radio communications and navigational equipment which may adversely affect reliability or airworthiness, such as changes which deviate from the component operating limitations as prescribed by the manufacturer; extension of receiver frequency range above or below the manufacturer's extreme design limits; major changes to the basic design of the avionics systems; and changes which deviate from the design environmental performance;
- o) changes to aircraft structure or cabin interior of aircraft which may adversely affect evacuation of occupants in any manner; and
- p) changes in airplane flight manuals and/or manual information in the form of placards or markings.

6.3.4 Typical Modification/ Retro fitments which may require consultation with the DGCA due to the nature of change proposed by the operator:

- a) substitution of materials, parts of processes on which insufficient information is available;
- b) new plating applications;
- c) new materials applications;

- d) ceramic coatings;
- e) use of synthetic resin glues;
- f) new stripping or plating coatings;
- g) new welding brazing techniques;
- h) alternative means for complying with Airworthiness Directives or approved service bulletins;
- i) any other complex special processes which, if not properly performed could have an adverse effect on the integrity of the product ; and
- j) any change to a required aircraft instrument system, flight management system or automatic flight control system

6.3.5 Minor Modifications/ Retro fitments :

Any other modification/ retro fitment than those described above are considered to be minor modification/ retro fitment. The Type certificate holder of the aircraft within his privilege can carry out minor modification/ retro fitment under intimation to DGCA (as State of Design). However, there should not be any difference of opinion of the TC holder with the DGCA so far as the classification of the said mod/ retrofit is concerned. Also; the TC holder shall submit all relevant documents regarding the minor mod/ retrofit to the DGCA and keep the DGCA informed regarding development/ completion of the said task.

The record retention requirements for minor modifications and repairs are much simplified, as no modification or repair may be called minor if it affects the airworthiness of the aeroplane. It is nevertheless necessary for the aeroplane operator to retain sufficient records to:

- a) identify the modification or repair and record that it has been classified as minor;
- b) record its location on the aeroplane;
- c) record mass and moment change, if significant; and
- d) record the return-to-service approval.

7. Guidelines for Change/ Repair approval and responsibilities of holders of approvals, installers, operators and states of design & registry.

The procedures for approval of modifications/ repairs and responsibilities of holders of approvals, installers, operators and states are in accordance with the guidelines of ICAO Doc 9760, vol. II, part B, chapter 5, Appendix B and C.

7.1 General :

When any modification/ change or repair is installed on an aircraft, care must be taken to ensure that it is compatible with all other design changes installed on that aircraft. Modifications or repairs designed separately may conflict or interfere with each other, despite having been individually analysed, tested and shown to comply with all applicable standards of airworthiness. Interaction between different modifications or repairs may be of a physical,

aerodynamic, structural or fatigue strength, electromagnetic or any other nature. Such interaction may jeopardize the airworthiness of the aircraft.

(a) An example of potential incompatibility would be a repair installed in close proximity to an existing repair. While the two repairs individually may be completely satisfactory if separately installed on an aircraft with no other design changes in the vicinity, the combination in close proximity may introduce additional stress concentrations which cause fatigue cracks to occur after a period of time in service. The designer of a repair scheme should survey the aircraft to be repaired to establish whether there are any other design changes in the vicinity which may interfere. In the case of an existing repair in close proximity to the new damage, it may be necessary to remove the old repair and install a new repair encompassing both damage areas, designed in a manner to reduce any stress concentrations to a level that will not produce fatigue cracking.

(b) In a more general situation, modifications may be separately designed for the same basic aircraft type by different organizations with no knowledge of the other's work. The modifications may be shown separately to comply with all applicable airworthiness standards; however, on attempting to install them on the same aircraft, it may be found that they physically interfere with each other. Alternatively, no problems may be encountered with the installations, but it may be found in service that the combination causes aerodynamic buffeting, stability or control problems, fatigue cracking, structural failure, electromagnetic interference, or any number of other problems. If the concurrent installations of different modifications are not rigorously assessed for compatibility, there exists the possibility that in combination they may cause serious airworthiness hazards.

(c) Modifications and repairs may be designed by the same organization that operates the aircraft into which they are incorporated. In the more general case, however, the organization that designs and obtains design approval for the modification or repair, the operator of the aircraft, and the organization that installs the design change on the aircraft may all be different. Their separate responsibilities are discussed below.

7.2 RESPONSIBILITIES OF HOLDERS OF APPROVALS

(i) In the case of a design change intended as a unique installation on a single aircraft, the aircraft records and the aircraft itself should be surveyed to identify all other design changes to the aircraft which may in any way interfere with the proposed installation. All such existing installations should be considered in the analysis and testing conducted to demonstrate compliance with the standards of airworthiness.

(ii) In the more general case where a design change is intended to be sold to many aircraft operators and incorporated on multiple aircraft, it may not be feasible for the designer of the modification or repair to obtain knowledge of the modification status of every aircraft affected. The designer should account for the effects of any potential incompatibilities between the proposed design change and any known existing or reasonably foreseeable modifications or repairs when conducting analyses and tests to demonstrate compliance with the standards of airworthiness and obtain design approval. Alternatively, limitations may be

placed on the design change, explicitly advising potential users that it has not been cleared for compatibility with other modifications or repairs and that the installer should obtain separate design approval for installation in combination with those others.

(iii) The holder of a design change approval has a responsibility to assist the DGCA to correct airworthiness deficiencies discovered in service. 'Design Certification and Continuing Airworthiness' which relate to the design change. If, during the course of investigating a perceived unsafe condition related to the design change, the approval holder determines that the unsafe condition results from an incompatibility between the design and another modification or repair, the approval holder should notify the DGCA immediately and recommend corrective measures. If the authority determines that the design change must be altered to prevent the unsafe condition from occurring in other aircraft on which it is installed, it will normally require the approval holder to develop the corrections and issue instructions for the installer. These instructions should provide corrective measures for existing installations and revisions to the installation instructions for future installations. The DGCA (as State of Design) shall issue an Airworthiness Directive to mandate the measures to correct the deficiency on existing installations.

7.3 RESPONSIBILITIES OF INSTALLERS

Because the holder of a design approval for a particular modification or repair cannot be expected to be aware and to have conducted analyses and tests for all the possible design changes installed on all aircraft of a given type, the installer has a responsibility to verify compatibility with other modifications and repairs before installing any design change. The installer shall survey the aircraft records and the aircraft itself to determine what other design changes exist on the aircraft. Any questions of incompatibility with other modifications or repairs arising from the survey should be referred for resolution to the operator.

7.4 RESPONSIBILITIES OF OPERATORS

(i) Operators have the overall responsibility to ensure the compatibility of all design changes incorporated in their aircraft. The operator contracting with an installer for incorporation of any aircraft modification or repair should provide the installer with information on all existing design changes to the aircraft so that compatibility may be verified. Any questions of design change incompatibility which may arise during installation or in service should be thoroughly investigated by consultation with the approval authority or approval holder, or by an independent engineering organization. In every case of incompatibility between modifications or repairs, the problem must be corrected and it must be established to the satisfaction of the authority of the State of Registry that the modified aircraft continues to comply with the applicable standards of airworthiness. In addition to correction of the problem on the aircraft on which it is discovered, it is necessary that any incompatibilities between modifications or repairs be addressed on all other affected aircraft. The operator should promptly report any design change incompatibilities detected during installation or in service to the approval holder, to the installer and to DGCA (as State of Registry).

(ii) For those repairs which are not covered in the SRM/ approved aircraft data, the operators have to consult the manufacturer under intimation to the DGCA.

7.5 RESPONSIBILITIES OF STATES

(a) The DGCA (as State of Design) issuing a design change approval shall require that compatibility with other existing modifications, repairs and airworthiness directives be adequately verified. Additionally, some authorities have a standard caution statement concerning compatibility with other design changes, which is included on each modification and repair approval document issued.

(b) The DGCA (as State of Registry) shall provide direction and guidance to aircraft operators and maintenance, modification and repair organizations to provide for the consideration of compatibility whenever a design change is installed on an aircraft. In such cases of repairs which are not covered in the SRM/ approved aircraft data and for which the operators have intimated the DGCA and the manufacturer, depending upon the nature of repair the DGCA may consult the respective State of Design (as may be the case) for guidance and approved repair scheme (if generated by the manufacturer in consultation with the state of design).

7.6 RETENTION OF MODIFICATION AND REPAIR DATA AND RECORDS

In accordance with CAR, section 2, series O, Part II, para 8.6, it has to be ensured that all modifications and repairs should comply with the applicable airworthiness requirements acceptable to the DGCA (as State of Registry). It should also be ensured that the substantiating data supporting compliance with the airworthiness requirements are retained by the respective operators (aircraft owned by whom has undergone repairs). The concerned operator shall ensure that the following records are kept for the periods as prescribed in para 8.4.2 of CAR, section 2, series O, part II.

7.7. RESPONSIBILITIES OF HOLDERS OF APPROVALS

(A) The DGCA (as State of Design) granting the approval of the design of the modification or repair should require that the holder of the approval retain the data used to demonstrate compliance with the applicable standards of airworthiness and to obtain approval of the design change. Retention of the data is required for record purposes and as a source of information to design corrective measures should difficulties be encountered with the modification or repair in service.

(B) The record of design approval will always need to be retained, but the additional data to be retained will vary considerably depending on the complexity of the modification or repair. In the case of a simple repair, the additional data may only be a drawing describing the repair, its location and installation on the aeroplane and the materials used, together with the

calculations and analysis used to demonstrate compliance with the design standards. For a more complex design change, the data to be retained will be more extensive. In addition to the record of design approval, the following is the kind of data that may be included, as applicable:

- a) a master documentation list and the individual drawings, photographs and specifications which define the design change;
- b) drawings, photographs and instructions necessary for the installation of the design change in the product;
- c) a compliance programme, a document listing each discrete design standard which must be satisfied, the method used in determining compliance (e.g. test, analysis, inspection) and the signature of a qualified person confirming the finding of compliance;
- d) engineering reports which contain the analyses, calculations and ground and flight test results used to make the determination that the modified product complies with the applicable design standards;
- e) a record of the change in mass and moment arm when the design change is installed in an aircraft;
- f) a record of the change in electrical load when the design change is installed in an aircraft;
- g) supplements to:
 - 1) the approved flight manual;
 - 2) instructions for continuing airworthiness or other maintenance instructions, including any airworthiness limitations; and
 - 3) repair instructions.

(C) The data should be retained by the approval holder until all the aeroplanes modified or repaired in conformity with the approved modification or repair are permanently withdrawn from service. The data should be available to the DGCA upon request. Some airworthiness authorities retain a duplicate copy of the data which may be used as a back-up if the approval holder goes out of business or for some reason fails to maintain the records.

(D) In some cases the person or organization to which the approval is granted may have contracted with another agency to conduct some or all of the analysis or testing required to show compliance with the design standards. The resultant substantiating data may be retained at the contractor's facility. Regardless of where the data are stored, the DGCA should make the approval holder responsible for ensuring that the data are retained and are available to the authority when required.

7.8 RESPONSIBILITIES OF AIRCRAFT OPERATORS

(i) The DGCA (as the State of Registry) shall require that the aircraft operator retain records identifying any modification or repair incorporated on the aircraft, together with records of

design approval and return-to-service approval. Retention of the records is required so that the modification and repair status of the aircraft may be readily established at any time. This may be necessary if an airworthiness deficiency is detected with a modification or repair requiring corrective measures or inspections and to ensure compatibility when making additional design changes to the aircraft.

(ii) The records required will vary with the complexity of the design change. In addition to the records of design approval and return-to-service approval, the following lists the kind of data that may be included, as applicable:

- a) a master drawing list and the individual drawings, photographs, specifications and records which identify the design change and locate it on the aeroplane;
- b) mass and moment change records; and
- c) a record of any change in electrical load caused by incorporation of the design change.

Part of the records should include a Supplemental Type Certificate (STC) or equivalent document, or service bulletin or structural repair manual reference, if applicable.

(iii) CAR, section 2, series O, Part I, 8.4.2 requires that the details of modifications and repairs to an aeroplane and its major components be retained for a minimum period of 90 days after the unit to which they refer has been permanently withdrawn from service. CAR, section 2, series O, Part I, 8.4.3 requires that in the event of a temporary change of operator, the records shall be made available to the new operator; and, in the event of any permanent change of operator, the records shall be transferred to the new operator.

(iv) Supplements to the approved flight manual, maintenance instructions, instructions for continuing airworthiness and repair instructions pertaining to a modification or repair are operating data that the operator should incorporate into the existing operating data for the aeroplane. Since these supplements become a permanent part of the operator's operating instructions or instructions for continuing airworthiness, they need not be retained as part of the records required by CAR, section 2, series O, Part I, 8.4.1 c). The operator should record the incorporation of the required supplements in the appropriate revision logs.



AIRCRAFT ENGINEERING DIRECTORATE
**DIRECTORATE GENERAL OF CIVIL
AVIATION**
OPP: SAFDARJUNG AIRPORT
NEW DELHI-110003

Handbook of Procedures
PART 4

Procedures for Continuing Airworthiness of
Type Design

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1 GENERAL

1.1 Introduction

The objective of the Handbook of Procedure is to establish the general principles to be followed by DGCA to perform environmental and airworthiness certification of aeronautical products, parts and appliances, including post certification activities, in accordance with the applicable CAR and AMC & GM. This part of handbook establishes the necessary associated detailed procedures for Continuing Airworthiness of Type Design.

1.2 Scope of Procedures

In accordance with the Chicago Convention of ICAO or its Annexes, DGCA shall carry out the functions and tasks of the State of Design (SoD), manufacture or registry. The issuance of TCs and changes thereto, and ITSO- Authorisations are fundamental parts of application of this principle.

According to Civil Aviation Regulations-21, DGCA shall also ensure the continuing airworthiness functions associated with the products, parts and appliances it has certified and issuing the applicable mandatory information, i.e. airworthiness directives (ADs).

This procedure describes how DGCA internally handles the continuing airworthiness functions related to the type design of aeronautical products.

The continuing airworthiness functions shall be performed in accordance with the provisions of CAR 21.3A and CAR 21.3B for the airworthiness and environmental certification of aircraft and related products, parts and appliances and the related Acceptable Means of Compliance (“AMC”) and Guidance Material (“GM”).

1.3 References

CAR-21, AMC & GM

1.4 Abbreviations / Terminology

AED	Aircraft Engineering Directorate
AID	Aircraft Inspection Division (Airworthiness Directorate)
AD	Airworthiness Directive
ADFP	Airworthiness Directive Focal Point
AFM	Aircraft Flight Manual
AMC	Acceptable Means of Compliance
AMOC	Alternative Means of Compliance
CRD	Comment Response Document
DOA	Design Organisation Approval
DAED	Director, Aircraft Engineering Directorate
DDAED	Deputy Director, Aircraft Engineering Directorate
DDG	Deputy Director General in-charge of AED (for this document only)
DG	Director General

DGCA	Directorate General of Civil Aviation
EASA	European Aviation Safety Agency
ETSO	European Technical Standard Order
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
ITSO	Indian Technical Standard Order
ICAO	International Civil Aviation Organisation
JDG	Joint Director General
JAR-OPS	Joint Aviation Regulation-Operation
PCA	Primary Certifying Authority (DGCA for Indian products)
PAD	Proposed Airworthiness Directive
PCM	Project Certification Manager
RTA	Request for Technical Advice
SoD	State of Design
SoR	State of Registry
STC	Supplemental Type Certificate
TC	Type Certificate
SARP	Standard and Recommended Practices

2. CONTINUING AIRWORTHINESS ACTIVITIES

2.1 General

After Type Certification or Certification of Changes and Repairs to an approved type design of an aircraft, engine, propeller, part or appliance, operational experience or any other acquaintance may show that the design does not fully comply with the applicable Certification Basis or that the Certification Basis is not sufficient to ensure a level of safety originally aimed for or that unsafe conditions exist on an aircraft which are likely to exist or develop on other products of the same type design. It is, therefore, the obligation of the TC holder to collect and review all available information related to the safety of the type design in order to take appropriate and on time action to correct any potential unsafe condition. Data relevant for assessing the continuing airworthiness of an approved type design may derive from regular type design reviews, mandatory occurrence and event reporting, accident or incident investigations, information collected by aviation authorities or any other sources.

2.2 Occurrence Reporting

In accordance with CAR 21, in general terms, an occurrence needs to be reported if the event has resulted, or may result in a potentially hazardous or unsafe condition.

Not all reportable events need to be investigated by DGCA. This procedure is applicable only to reportable events linked to design, having an implication upon the certification or maintenance aspects of aircraft, products, parts and appliances. The reportable events are not necessarily unsafe conditions but experience has shown that they are appropriate means for controlling the airworthiness of products.

2.2.1 Maintenance Organisation Responsibilities

The approved maintenance organisation is responsible for reporting occurrences found during performance of maintenance tasks to DGCA (Authority which has the oversight responsibility for the approved maintenance organisation), the State of Registry (SoR), the TC holder and the Operator.

2.2.2 Owner/Operator Responsibilities

The operator is responsible for reporting to the State of Operator and TC holder regarding events occurring during operations, and when the defect may have an impact on the continuing airworthiness of the aeroplane type.

In accordance with CAR, Section 2, faults / malfunction observed during maintenance shall be reported to the TC holder, SoR and/or State of Operator.

2.2.3 Design Approval Holder Responsibilities

In accordance with CAR 21.3 A (a) and (b), the holder of a TC, restricted TC, STC, ITSO authorisation, major repair design approval or any other relevant approval deemed to have been issued under CAR 21 (referred as “certificate holder” hereafter), shall have a system to collect and analyse the data related to reportable occurrences. This system shall be made available to all operators of the product.

The certificate holder shall carry out an analysis of the data received, and if a potentially hazardous or possible unsafe condition is identified, report all such occurrences to the DAED (PCM). Such reports should be made within 72 hours of the identification of a potentially hazardous or possible unsafe condition

If applicable the certificate holder shall carry out an investigation, according to the criteria of CAR 21.3(c).

For products where DGCA is not the PCA, reporting shall be in accordance with the appropriate Working Arrangement / Bilateral agreement or as stipulated by DGCA.

2.2.4 Reserved

2.2.5 DGCA 's Responsibilities

Where DGCA is the PCA, it carries out the state's function and task of the State of Design (SoD), manufacture or registry. Related to design approval, the DAED takes his decision and appropriate action based on analysis and investigations made by the certificate holder or any other information and would define appropriate actions. The subsequent action may range from recommendation for improvements as suggested by the certificate holder for corrective action (inspection, maintenance action or design change) that needs to be made mandatory by issue of an Airworthiness Directive (AD). The criteria for issuance of an AD are defined in CAR 21.3B and associated AMC material.

Airworthiness Directorate (AID) deals with the cases where DGCA is not a PCA.

2.3 Recommendations from Accident Investigation Authorities

DGCA maintains a tracking system to record status of Safety Recommendations addressed to DGCA and their closing actions in the form of a database.

The database is the means by which feedback is provided to the accident investigation team (Air Safety Directorate of DGCA) regarding the DGCA /AED status and closure of Safety Recommendations arising from reported accidents and serious incidents.

2.4 Other Continuing Airworthiness Activities

The analysis of available occurrence reporting databases and any other information coming from any person or organisation may be considered, to ensure the continuing airworthiness of products, parts and appliances.

In addition, the DAED organises regular Airworthiness Review meetings in order to permanently monitor the continuing airworthiness of products, parts and appliances under his responsibility.

3 CORRECTIVE ACTIONS

Continuing Airworthiness activities as described above, may result in the need of corrective actions for certified products, parts and appliances.

When DGCA is the PCA, as per obligations of SoD, it shall issue an AD whenever it is necessary to correct an unsafe situation related to an aircraft design.

Moreover DGCA shall, to fulfil obligations deriving from ICAO SARPs, transmit the information to all the Contracting States that have informed DGCA that, an Indian certified aircraft has been entered on their registry, to allow those States to fulfill their obligations as SoR. The information is transmitted in the English language.

As soon as DGCA-AED issues and distributes an AD, AED informs the operators, owners and TC holder of the affected aircraft that they have to comply with the AD. Operators have to contact the TC/STC holder to obtain all the necessary information to comply with the concerned AD.

4 AIRWORTHINESS DIRECTIVE PROCESS

4.1 Proposal of Corrective Actions

When DGCA has determined that an unsafe condition exists in an approved aircraft type design, as a result of a deficiency in the aircraft, or an engine, propeller, part or appliance installed on this aircraft, and that condition is likely to exist or develop in other aircraft, the DAED in-charge of the affected product requests the holder of the TC, restricted TC, STC, major repair design approval, ITSO Authorisation or any other relevant approval, to propose appropriate corrective actions for DGCA's

approval. Details of these proposals are submitted to the DAED. The DAED intimates the DDG through an internal note.

If the unsafe condition is related to a part or appliance installed (or eligible to be installed) on an aircraft, then a proposed corrective action is sent, by the certificate holder of the product, part or appliances affected, to the DAED. The DAED intimates the DDG through an internal note.

4.2 Drafting of Proposed Airworthiness Directives (PAD)

The DAED with other AED officers reviews the proposed corrective action submitted by the Certificate holder and then drafts a PAD using DGCA- AD Form (see Annex I). If deemed necessary by the DAED, further co-ordination with the Certificate holder, may take place.

In case of disagreement between the DAED and the Certificate holder, the DAED refers the issue to the DDG for final decision. The DDG may decide to consult the experts and seek their advice.

Based on the opinion of experts, the DDG may advise DAED to amend the PAD, if deemed necessary. In the absence of any proposal from the TC/STC holder or if the TC/STC holder is not willing to sufficiently cooperate, the DAED drafts his own PAD.

The final version of the PAD is sent to the DDG for concurrence. After DDG's consent the PAD is sent to Airworthiness Directive Focal Point (ADFP) for further processing and consultation. In normal circumstances, DDAED / any officer is given the responsibilities of ADFP.

4.3 PAD Consultation Process

Once the ADFP receives a PAD, he assigns a number to the PAD and review its format and incorporate comments given by DDG. The ADFP then publishes the final PAD for consultation on DGCA website.

The comment period, in principle, is one month. If deemed necessary, DAED may decide to modify this period depending on the type of PAD. Comments are sent to the ADFP. Address and contact information are published on DGCA website. The ADFP receives all comments. After collecting responses / comments, ADFP drafts Comment Response Document. The CRD is then submitted to the DAED for his comment. The DAED with his team reviews the comments received and give appropriate responses. The experts may be consulted where appropriate. The DAED intimates the DDG and the ADFP when consultation with the panel of experts has been sought. DAED then instructs the ADFP to do the necessary amendment to the PAD.

The ADFP amends the PAD as required, in co-ordination with the Certificate holder. The whole phase of the consultation process does not last more than two months.

4.4 Approval of the PAD

The ADFP drafts the final PAD and sends it to the DAED for final review and approval. DAED then consults Airworthiness Directorate for their observation and comments. After incorporating necessary amendments, DAED submits the PAD to DDG for approval. DDG refers the finalized AD to AD cell to examine.

The DDG reviews the comment of AD cell and submits the final PAD to JDG for approval. With signature of the DDG /JDG, the PAD becomes an DGCA approved AD.

4.5 Notification, Distribution and Publication of the AD

4.5.1 Notification

The ADFP allocates a AD number and sends the approved AD to the TC / STC holder or the holder of ITSO Authorisation and operator, by e-mail and also by regular mail.

4.5.2 Distribution

In addition to above intimation to the TC/STC holder/operator, the ADFP sends the information on approved ADs (aircraft, engines, propellers, parts and appliances installed on aircraft) by e mail and regular mail to following organisations:

Where DGCA is the PCA, in accordance with 4.3.2, Chapter 4 of Part II of Annex 8 to the Chicago Convention, the information on the AD shall be sent to:

- (a) Any SoR who, in accordance with chapter 4.3.1 of Part II of ICAO Annex 8, has advised the SoD that it has entered the aircraft on its register; and
- (b) Any other Contracting State on request;

Where DGCA is not the PCA, information on AD, shall be sent to:

the SoD in accordance with chapter 4.3.4 of Part II of Annex 8 to the Chicago Convention.

If there is any other suitable means of advising, which is more convenient and effective than the email system, DGCA may decide to use it. The email system is used a normal practise to deliver the information quickly.

4.5.3 Publication

ADFP uploads the approved AD in DGCA website. He takes the help of any other officer, if deemed necessary.

4.6 Emergency AD Procedures

4.6.1 Drafting of Emergency AD

In case of situations in which emergency action by DGCA is required, the DAED (PCM) reviews the proposed corrective action submitted by the Certificate holder. The DAED assesses, if an Emergency AD is appropriate. The DAED then drafts the

Emergency PAD in co-ordination with the Certificate holder, if available. As the Emergency PAD requires immediate notification and publication, the DAED sends the Emergency PAD to the ADFP as soon as possible, in conjunction with the referred assessment, for immediate processing, approval and publication on the DGCA website. DAED takes consent of DDG/JDG.

DGCA may decide not to implement the consultation process. A justification explaining why the consultation process is not followed and the reasons for issuing an Emergency AD is provided in the text of the Emergency PAD, under the item (13) "Reason" (see Annex I).

4.6.2 Notification, distribution and publication of Emergency ADs

After approval by the DDG / JDG, in accordance with chapter 4.4, the DAED advises immediately for issuance of an Emergency AD.

Intimation, distribution and publication of Emergency ADs follow the provisions under 4.5.

The effective date of the Emergency AD is the date of approval unless otherwise specified in the AD itself.

4.7 Changes to previously issued AD

4.7.1 General

If changes to previously issued ADs are deemed necessary, these changes are issued as corrections or revisions to the original AD depending on the nature of the material being changed. In addition, ADs may be superseded by new ADs depending on the nature of the material being changed. The **Table I** at the end of this section is used to determine what type of change is being carried out. When using the table or the information contained in this section, there are three considerations to keep in mind:

- (a) The first consideration is whether the material is changed because of a technical error; e.g., the published material was wrong and the change is classified as a correction. If the material was correct as published, but needs correction now, then this is classified as a revision or supersedure.
- (b) The second consideration is whether the information is substantive or non substantive; that is, whether it affects the substance of the AD or not.
- (c) The final consideration is the effect the change will have on the AD system and on the owners/operators who would be affected by the AD.

Issuance of corrected, revised or superseded ADs for aircraft, engines, propellers or parts and appliances installed on aircraft is advised by the ADFP, following the provisions of Chapter 4.5 above.

4.7.2 Corrected AD

The simplest form of an AD change is a corrected AD of non substantive material, i.e., the change has no effect on compliance with the AD. An AD may require correction of a non substantive DGCA error or a printing error in the DGCA web.

If a non substantive error is found in an AD before it is placed on the DGCA web, it may be called for correction. The DAED reviews the supposed error in the AD in coordination with other officers, if necessary. Then, the ADFP corrects the AD and submit it to the DAED for approval and publication.

If a non substantive error is found after the document is uploaded on DGCA website for public consultation, but before it has been finally adopted and published, the DAED cancels the publication. The document is removed from public display and returned to the DAED. Then, the ADFP corrects the AD and submit it to the DAED for approval and publication.

Anyone who thinks that there is a substantive/ non-substantive error in an AD contacts the DAED and forwards his/ her observation.

4.7.3 Superseding AD

With a few notable exceptions, a substantive change to an AD, is issued as a superseded AD. Substantive changes, including corrections, are those made to any instruction or reference that affects the substance of the AD.

Substantive changes may include part numbers, service bulletin and manual references, compliance time, expanded applicability, methods of compliance, corrective action, inspection requirements, and effective dates.

In general, whenever there is an additional (or different) requirement imposed or an expanded scope of required inspection, the change should be issued as a superseded AD. Substantive changes to an AD is assessed by the DAED in coordination with the Certificate holder.

If an error occurs in an AD, then the DAED assesses in coordination with the TC/STC holder, if it is possible to comply with the AD as published. If it is not, he informs the ADFP and a superseding PAD is submitted to DDG for approval. Additionally, the DDG assesses if the superseding PAD should be an Emergency AD or not.

After approval of DDG, the DAED sends the Emergency PAD/ superseding PAD immediately to the ADFP for distribution and publication. The reason paragraph should include a discussion of each change, how each change affects compliance, and the fact that all other parts of the AD remain as originally published.

A superseding AD gets a new AD number; the previous AD is deleted from the DGCA web site. The ADFP archives superseded ADs.

4.7.4 Revised AD

The DAED assesses in coordination with the TC/STC holder, if a revised AD should be issued and then forwards the proposed revised AD, which has been submitted to him by ADFP, to the DDG for approval.

In the following cases, a revised AD is considered appropriate:

(a) in order to issue necessary changes to material that is non-substantive in nature.

Examples to this include a change in the address, where a service bulletin is available or a change in the name of the contact person.

(b) if the change is due to addition of an optional terminating action.

(c) for reduced applicability.

(d) to correct substantive errors that causes compliance to be impossible.

The DAED submits the proposed revised AD to the DDG for approval. The reason paragraph includes a discussion of each change, how each change affects compliance, and the fact that all other parts of the AD remain as originally published.

The heading would be "AD correction" in the ACTION line (item (10) in Annex I).

A revised AD retains its AD number with the addition of the revision number

When AD revisions are for changes of material that are non-substantive in nature, public consultation is not required. If the DDG agrees with the proposed revised AD, he approves it and forward it to the DAED for numbering and publication on the DGCA web.

The full text of a revised AD is published on the DGCA website and redistributed.

TABLE I

Type of Change	Revision	Supersedure	Correction
Non-substantive correction			X
Additional Requirement		X	
Expanded applicability		X	
Reduced compliance time		X	
Additional inspection(s)		X	
Mandatory terminating action		X	
Reduced applicability	X		

Extended compliance time	X		
Optional inspection method	X		
Optional terminating action	X		
Substantive correction - impossible	X		
Substantive correction - possible		X	

4.7.5 Alternate Methods of Compliance (AMOC) for AD

If requested and appropriately substantiated, DAED may accept an alternate methods of compliance for an AD.

4.8 Reserved

4.9 Reserved

5.0 General Instruction for Continued Airworthiness

In accordance with CAR 21.61, the holder of the Type Certificate of a product, shall furnish at least one set of complete Instructions for Continued Airworthiness comprising descriptive data and accomplishment instructions prepared in accordance with the applicable requirements (FAR-23, FAR-25, FAR-27, FAR-29, etc, as applicable), to each known owner of one or more aircraft or aircraft incorporating the product, upon its delivery or upon issue of the first Certificate of Airworthiness for the affected aircraft, whichever occurs later and thereafter make those instructions available on request to any other person required by another CAR to comply with any of the terms of those Instructions. In addition, changes to the Instructions for Continued Airworthiness shall be made available to all known operators of the product and shall be made available on request to any person required by another CAR to comply with any of those Instructions.

These Instructions for Continued Airworthiness shall include a continuing structural integrity program to ensure the airworthiness of the aeroplane. The program shall include specific information concerning the corrosion prevention and control. Guidance on the development and implementation on Corrosion Prevention and Control Program (CPCP) can be taken from FAA’s AC No. 120-CPCP.

In accordance with para 4.3.2 of Part II of ICAO Annex 8, the State of Design (i.e. India in this case) of an aircraft shall transmit any generally applicable information which it has found necessary for the continuing airworthiness of the aircraft and for the safe operation of the aircraft as follows:

- a) to every Contracting State which has, in accordance with para 4.3.1 of Part II of ICAO, Annex 8, advised the State of Design that it has entered the aircraft on its register;
- b) at the time of issue of export C of A, the importing country, in which the aircraft is to be registered, must intimate the DGCA, in accordance with para 4.3.1 of Part II of ICAO, Annex 8, that it will intimate the State of Design (India in this case) that it has entered the aircraft on its register; and
- c) to any other Contracting State upon request.

In order to accomplish this, the Type Certificate holder shall develop a system for transmission of the information for the Continuing Airworthiness of the aircraft and shall incorporate the procedures for the same in the chapter on Continuing Airworthiness of aircraft of its Design Organisation Manual (DOM).

In accordance with para 4.3.6 of Part II of ICAO Annex 8, the State of Design (i.e. India in this case) shall ensure that in respect of aeroplanes over 5 700 kg and helicopters over 3 180 kg maximum certificated take-off mass, there exists a system for receiving information submitted in accordance with para 4.3.5 of Part II of ICAO Annex 8 by the State of Registry that shall ensure, there exists a system whereby information on faults, malfunctions, defects and other occurrences that cause or might cause adverse effects on the continuing airworthiness of the aircraft is transmitted to the organization responsible for the Type Design of that aircraft.

In order to accomplish this, the Type Certificate holder shall establish a system for receiving information on faults, malfunctions, defects and other occurrences that cause or might cause adverse effects on the continuing airworthiness of the aircraft and shall incorporate the procedure in the chapter on Continuing Airworthiness of its DOM. The procedures would also include deciding if and when airworthiness action is needed, developing the necessary actions and promulgating the information on these actions including that requested in para 4.3.2 of Part II of ICAO Annex 8. The TC holder will have a procedure to ensure parallel reporting system of any fault, malfunction, defect and other occurrences for aeronautical products designed in India to both R&D and Airworthiness Directorate.

In the DOM the Type Certificate holder should indicate the persons responsible for receiving the information on malfunctions, defects, etc, for analysis and decision making, for approval of DGCA, issue of Service Bulletins, etc, and intimation of the same to the operators / State of Registry. The AED and the Airworthiness Directorate of DGCA are involved in approval of instruction for continued airworthiness.

6.0 Defect reporting :

After receipt of reports from the primary source of information, design organization will normally perform some kind of analysis to determine whether an occurrence has

resulted or may result in an unsafe condition and report to DGCA should be made. The format of defect reporting by Design Organisation to DGCA is as placed below:

FORMAT OF DEFECT REPORT


1. NAME OF THE DESIGN ORGANISATION:
2. TYPE OF AIRCRAFT :
3. MANUFACTURER’S SERIAL NUMBER (MSN):
4. A/C REGN : VT-
5. DATE OF OCCURRENCE:
6. PLACE OF OCCURRENCE:
7. DETAIL OF DEFECT AND CIRCUMSTANCES UNDER WHICH IT WAS DETECTED/ OCCURRED:
8. AFFECTED PART(S):
9. CAUSE OF THE DEFECT/ FAILURE/ MALFUNCTION:
10. RECTIFICATION ACTION TAKEN BY DESIGN ORGANISATION:
11. STATUS OF INVESTIGATION : **OPEN/ CLOSE**

(Strike out whichever is not applicable)

SIGNATURE
NAME
DESIGNATION

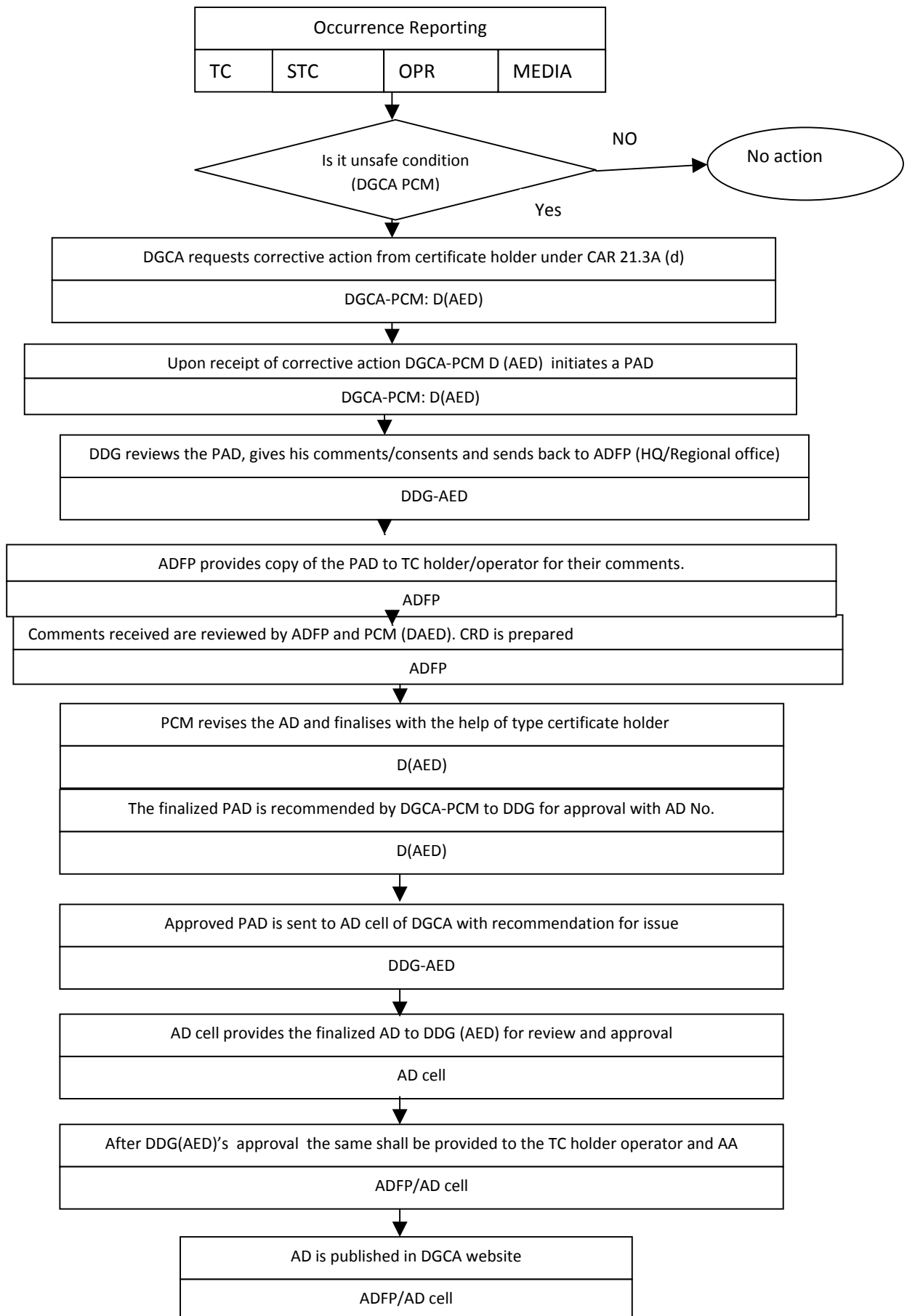
DATE:

Annex I: DGCA AD FORMAT

 AIRCRAFT ENGINEERING DIRECTORATE OFFICE OF THE DIRECTOR GENERAL OF CIVIL AVIATION OPP: TO SAFDARJYNG AIRPORT NEW DELHI-110003		
(PROPOSED / EMERGENCY) AIRWORTHINESS DIRECTIVE	(1) AD No : YYYY-XXXX - (E) (PAD No : YY-XXX) (2) Issued/Date: dd. mm. yyyy	
(3) No person may operate an aircraft to which an Airworthiness Directive applies, except in accordance with the requirements of that Airworthiness Directive unless otherwise agreed with the Authority of the State of Registry.		
(4) Type Approval Holder		(5) Type/Model designation(s)
(6) TC / STC (Data Sheet) or ITSO Number(s)		
(7) Foreign AD Number		
(8) Supersedure		
(9-a)ATA Chapter name	9-b) Name of the affected part/ system	(9-c) Required action
(10) Action		
(11) Manufacturer(s):		
(12) Applicability:		
(13) Reason:		
(14) Effective Date:		
(15) Compliance:		
(16) Ref. Publications:		
(17) Remarks:	1. If requested and appropriately substantiated , the responsible DAED for the related product has the authority to accept Alternative Methods of Compliance (AMOCs) for this AD. 2. This AD was circulated as PAD YY-XXX for consultation on <i>dd MMMM YYYY</i> with a comment period until <i>dd MMMM YYYY</i> . The Comment Response Document can be found at	

	<p>http://www.dgca.nic.in</p> <p>3. Enquiries regarding this AD should be addressed to DDG, AED, Office of DGCA, Opp : S.J.Airport, New Delhi- 110003</p> <p>AD -Focal Points:</p> <p>a) DDAED/ DAED (Bangalore), AED, DGCA, RWR&DC,HAL, Post; Vimanpura, Bangalore-560017 ; and</p> <p>b) DAED, O/O DGCA, Opp Safdarjung Airport, New Delhi- 110003</p> <p>4. For any questions concerning the technical content of the requirements in this AD/ SB , please contact the <i>manufacture</i>.</p>
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Annex 2 : FLOW CHART FOR PROCEDURE TO ISSUE OF AN AD





AIRCRAFT ENGINEERING DIRECTORATE
DIRECTORATE GENERAL OF CIVIL AVIATION
OPP: SAFDARJUNG AIRPORT
NEW DELHI-110003

Handbook of Procedures
PART 5

Design Organisation Approval Procedure(DOAP)

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1 GENERAL

1.1 Introduction

Rule 133B of the Aircraft Rules, 1937 stipulates that organisations engaged in design and manufacture of aircraft, aircraft components and items of equipment including materials, forgings, castings and standard parts shall be approved by the Director General of Civil Aviation. DGCA may, on request and after being satisfied, approve an organisation to operate under the system of approval. For operating under an approved system, the organisation or person shall comply with such requirements as may be specified by the DGCA. The requirements for approval of design organisation are laid down in CAR-21.

DGCA accepts an application for a Type Certificate submitted by a person holding an appropriate DOA under subpart JA of CAR 21 or having had the application for DOA under requirement CAR 21. A233.

1.2 Scope of the Procedure

This procedure describes how DGCA internally handles the approval of design organisations. This approval is performed in accordance with the provisions CAR 21 Subpart JA/ JB which lays down procedures for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations.

This approval is also performed in accordance with the related Acceptable Means of Compliance (“AMC”) and Guidance Material (“GM”).

This procedure also describes how DGCA handles the continuation, change, limitation, suspension or revocation of the approvals of the aforementioned organisations according to CAR 21.

1.3 Abbreviations / terminology

AED	Aircraft Engineering Directorate
AID	Aircraft Inspection Division (Airworthiness Directorate)
AMC	Acceptable Means of Compliance
CAR	Civil Aviation Requirements
DOA	Design Organisation Approval
DOAT	Design Organisation Approval Team
DOA Manager	Design Organisation Approval Manager (DGCA officer)
DOM	Design Organisation Manual
DAED	Director, Aircraft Engineering Directorate
DDG	Deputy Director General in-charge of AED (for this document only)
JDG	Joint Director General
DG	Director General
DGCA	Directorate General of Civil Aviation
EASA	European Aviation Safety Agency

FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
OCP	Organisations Certification Procedure
TL	Team Leader (Investigation)

1.4 References

- a) Aircraft Rules, 1937.
- b) Civil Aviation Requirements (CAR)-21
- c) Acceptable Means of Compliance (AMC) and Guidance Material (GM) to CAR- 21.

2 APPLICATION AND ALLOCATION OF TECHNICAL INVESTIGATION TASKS

2.1 Acceptance of Application

Applications for an DGCA Design Organisation Approval is sent to the DAED and made in accordance with CAR-21.233. Details about format, address can be found in CAR 21 up loaded on DGCA website. The fees applicable as mentioned in CAR 21, is paid to DGCA after receipt of preliminary acceptance letter from AED.

The DAED acknowledges receipt of applications with-in fifteen working days following the date of receipt by DGCA.

The DAED checks the applications. In case of incorrect or incomplete information, the DAED intimates the applicant as soon as possible by a letter mentioning the omissions and errors. For any technical issue, the DAED consults the DDG.

The DAED, together with his team, makes a first check on eligibility according to CAR-21 and determines how to proceed with the application. The DAED intimates the applicable requirements and any other information deemed necessary, to the applicant within the month following receipt of the correct application.

In case of refusal of an application, the DAED intimates his decision in writing to the applicant together with the reasons thereto. The DAED takes necessary approval from the DDG before issuing the preliminary acceptance of the proposal.

When the eligibility has been fully assessed, the DAED informs the applicant, under intimation to the DDG, on the following:

- (a) Whether its application is accepted or not. If not the reason there to:
- (b) Project / File number (for example XX- XX / year- AED)
- (c) Fees associated with the application
- (d) Preliminary acceptance of the proposal

After receipt of fees, the DAED updates the DGCA approvals database with all the relevant information and the design organisation approval process starts.

2.2 Allocation of technical investigations tasks

After eligibility has been fully assessed and for grant of principle acceptance, the DAED takes approval of the DDG.

For technical investigation, the DAED establishes an DGCA DOA-team which may consist of Deputy Director, Senior Scientific Officers, Scientific Officers and Junior Scientific Officers from AED.

Normally, the DAED is allocated the responsibilities of DOA Manager who leads a team of specialist.

3 DETERMINATION OF THE DOA TEAM

A DOA Team (DOAT) is established for the investigation to be performed. The team consists of a team leader and team members. Where the extent of the investigation does not justify the need for a team, one person may perform the investigation.

The DAED nominates a DOA Team Leader in consultation with DDG. In selecting the DOA Team Leader, the following personal attributes are considered:

- (a) technical experience
- (b) knowledge of:
 - certification and certification procedures for aircraft and related products and parts
 - methods for the approval of organisations
 - audit practice
- (c) capability:
 - to lead a team
 - to prepare reports
 - to be diplomatic

After nomination, the DOA Team Leader initiates the procedure for determination of the DOAT. The Team consists of:

- (a) persons having:
 - general knowledge of CAR 21
 - knowledge of CAR 21 Subpart JA/JB and corresponding AMC and GM and their application
 - an appropriate aviation knowledge;
- (b) persons able to verify that the applicant works in accordance with the handbook/DOM, and able to check the effectiveness of the procedures by audits;
- (c) persons able to verify the competence of the applicant personnel; and
- (d) officers equal or above the rank of a Scientific Officer.

The DOAT Leader agrees with the DAED the size of the DOAT and the specializations to be covered, taking into account the scope of work and the characteristics of the applicant.

The DAED nominates and then communicates the composition of DOAT to the applicant justifying the need of a technical investigation.

A DOAT is maintained as long as the DOA remains valid. The duties of the DOAT Leader are as follows:

- (a) to initiate the procedure for determination of DOAT;
- (b) to determine the size of DOAT and the specialisations to be covered, for initial and renewal of approval and subsequent continued surveillance, and to modify the composition of the DOAT as necessary;
- (c) to advise DAED for suitable DOAT members;
- (d) to advise DAED to form the DOAT;
- (e) when deemed necessary, to select suitable advisers for specialized area under approval of the DAED;
- (f) to organize the work of DOAT such as planning, areas to be covered, work sharing between the members etc;
- (g) to intimate the applicant regarding the process which will be applicable;
- (h) to process alternatives to AMC or GM to Part 21, Subpart JA/JB, taking approval of the DAED ;
- (i) to provide coordination within DOAT, to control the efficient operation of the DOAT and to impose a consistent approach;
- (j) to report to the DAED, as described in paragraph 4.1, and any problems encountered during the investigation;
- (k) to ensure liaison with other DGCA officers engaged in product certification activities with the applicant;
- (l) to ensure that adequate records are kept; and
- (m) to report the findings to the DAED, with proposed terms of approval and limitations as appropriate.

The duties of team members associated with DOA are:

- (a) to perform the work assigned by the DOAT Leader;
- (b) to transfer experience of relevant problem areas with persons involved in approval processes of design data (Type Certification, STC, approval of design changes or repair design).

4 CERTIFICATION PROCEDURE

When the investigations are allocated to a DOAT, the team follows the procedures described below.

4.1 Investigation for Initial Organisation Approval

The DOAT satisfies itself that the compliance has been shown with CAR 21, Subpart JA/JB and other subparts relevant to the scope of work applied for.

In performing its role, the DOAT takes into account the experience/expertise available from other DGCA officers.

4.1.1 Initiation (phase 1)

The DOAT Leader initiates the investigation process by organising a first meeting with the applicant for:

- (a) a general presentation of the applicant
- (b) a description, by the DOAT, of the investigation process, as detailed in 4.1.2 to 4.1.5 hereafter.

The DOAT Leader sends the minutes of this first meeting to the DAED for information and suggestion. The DAED intimates the DDG about the activity of this phase through an internal note.

4.1.2 Preparatory phase (phase 2)

At the beginning of the process, the DOAT :

(a) studies the design organisation handbook / DOM and associated data, taking into account that the DOAT members have the knowledge about the applicant and in-service experience data of the applicant's other products.

(b) establishes the investigation program with:

- short description of the Design Organisation (location of facilities, scope of work, flowcharts) ;
- identification of the key features of the Design Organisation (design work sharing, compliance verification, airworthiness organisation, system monitoring);
- tasks to be performed by the DOAT; and
- detailed planning of the assessment / audit (dates, subjects, location).

This preparatory phase is an internal DOAT working phase made up of individual DOAT member studies and preparation, and complete DOAT working sessions managed and organised by the DOAT Leader.

At the end of phase 2, the DOAT Leader submits an internal note to DAED for approval. DAED intimates the DDG about the activity of this phase through an internal note.

4.1.3 Presentation to the applicant of the investigation program (phase 3)

The DOAT intimates the DGCA approved investigation program and consolidated time schedule of the DOA process to the applicant.

4.1.4 Investigation activities (phase 4)

During this phase, the complete system is reviewed, first to check exhaustively that the design organisation of the applicant complies with the CAR 21 Subpart JA/ JB and other subparts relevant for the scope of work applied for, secondly to check, as practicable on a sample basis that, the applicant is actually working in accordance with the system described in DOM.

For each subject defined in the investigation program, the following process follows:

- (a) preparation of a questionnaire by the DOAT, with clear references to CAR 21 and DOM ;
- (b) sending the questionnaire by the DOAT Leader to the applicant;
- (c) review of the questionnaire with the applicant during a meeting;
- (d) a comprehensive audit of all departments of the design organisation;
- (e) follow-up of questions raised until a satisfactory answer is obtained by the DOAT;
- (f) follow-up of open actions up to their closures; and
- (g) performing audits on a sample selected by the DOAT, if deemed necessary.

During phase 4, when the key features of the Design Organisation have been assessed, the DOAT Leader submits a status report through an internal note to the DAED for approval. The DOAT then completes the investigation of the remaining points. The findings are reported through a non-conformance form (see Annexure I).

Whenever new items are identified, the investigation program is amended to include them.

The DOAT takes into account the information from other DGCA officer engaged in product certification activities with the applicant.

When all subjects have been processed as defined above, and the audits completed to the satisfaction of the DOAT, then the phase 4 is deemed to be completed. However, as the advise by the DOAT based audit findings may take time for implementation, these action may remain open at the end of this phase, subject to a corrective action programme agreed by the DOAT. The finding are recorded in a non-conformance form.

4.1.5 Conclusion phase (phase 5)

The DOATL prepares a final report through an internal note and submits to the DAED for review and necessary action.

The DOAT Leader provide the applicant with the conclusions of the investigation after taking consent from the DAED.

4.2 Issuing the Organisation Approval Certificate

After submission of the final internal report by DOAT leader, the DAED prepares an internal note with his observation and recommendation and submits to DDG for approval. The DDG informs the Joint DG / Director General (DG) by an internal note about the successful closure of the technical investigation process for DOA. After DG /JDG's approval, DAED prepares a DOA Certificate to be signed by the JDG or DDG., and ensures that all necessary steps for the closure are performed.

The DAED takes necessary steps to:

- (a) send the DOA Certificate and associated terms of approval to the applicant with copy to regional office and any other organisation , if felt relevant; and
- (b) enter the information in the database of design organisation approvals.

4.3 Changes to scope of approval

For changes to the design assurance system that are significant according to CAR 21. A / B 247 and changes to the scope of approval, the application for approval of such changes is sent directly to the DAED who assigns the work to the Team Leader in-charge of the organization.

The DOAT Leader conducts investigations as necessary to verify continued compliance with the relevant requirements of Part 21, and produce a final report through an internal note including the draft updated scope of approval.

Following submission of final report form DOATL, the DAED submits an internal note with his observation to the DDG for approval of draft updated scope of approval and a new DOA Certificate, if deemed necessary.

The DDG informs the Director General (DG) / JDG through an internal note about the extension of scope of approval and the technical investigation process for extension. After DG /JDG's approval, the DAED prepares a DOA Certificate with updated scope of approval to be signed by the JDG or DDG., and ensure that all necessary steps for the closure are performed.

The DAED :

- (a) sends the DOA Certificate and/or associated terms of approval to the applicant;
- (b) updates as necessary the database of approvals.

Changes that are not significant according to CAR 21.247 do not require a new application. These are evaluated during the continued surveillance. However, the non-significant changes are granted acceptance by regional office under intimation to headquarter.

4.4 Continued Surveillance

Surveillance of all Design Organisations will be carried out as per the Surveillance Procedure Manual. (available on DGCA website)

For each DOA, the DOAT Leader:

- (a) produces each year a programme defining the surveillance activities of the coming year. The first programme is included in the final report documenting the initial assessment performed for issue of the DOA. The programme for the next year [Y+1] is included in the annual surveillance report of year [Y]. Programmes are also established to provide the detail record of last three years of audit and compliance of the organisations with respect to applicable requirements of CAR 21;
- (b) takes due consideration of information coming from approval processes of design data (Type Certification, STC, approval of design changes or repair design), and continued airworthiness activities;
- (c) takes due consideration of the DOA holder's internal surveillance activities;
- (d) carefully follows-up the corrective actions coming from previous assessment or surveillance activities; and
- (e) produces an annual surveillance report.

The DOAT Leader systematically plans an annual meeting dedicated to the review of the internal system monitoring of the DOA holder, in order to:

- (a) review the system monitoring activities and results of the past three years;
- (b) assess the programme established by the DOA holder for the coming year, taking in to account of the experience gained by the DOA Teams during Type Certification, approval of major changes or repairs, or continued airworthiness activities;
- (c) record which CAR 21 requirements have been evaluated for continued compliance; and
- (d) decide which surveillance actions will be performed directly by the DOAT.

The other planned surveillance activities are either :

(a) formal reviews to discuss specific points and to follow identified actions;

Or

(b) specific analysis, based upon anomalies seen through the day-to-day working experience with DGCA, in order to seek potential reasons for deficiencies against the agreed procedures;

Or

(c) audit, to verify compliance with applicable requirements.

The DOAT Leader is responsible for management of the DOA surveillance activities for the organisations under her/his control.

The involvement of the DAED (Project Certification Managers), certification specialists in DOA surveillance is always decided by the DDG, either by regular and scheduled reviews (annual programme) or by specific investigations. Such involvements are required, to check, on a sample basis, the adequacy of the work, performed by the DOA holder under DOA privileges.

When the DOAT Leader finds objective evidence of non-compliance of holder of the design organisation approval with the applicable requirements of CAR 21, this finding shall be classified in accordance with CAR 21.A /B 258(a).

Level one and two findings must be addressed as per the time period specified in Enforcement Circular No. 1 of 2009 dated 1st September 2009.

The DOAT Leader identifies any level three finding as defined in 21.A258(b) in respect of the holder of the design organisation approval, in the audit report and intimates the DOA under intimation to the DAED.

The DOAT leader submits the annual surveillance report to the DAED. The DAED submits the final report with his observation to DDG for approval.

5 ADDITIONAL PROVISIONS

5.1 Reporting System

CAR-21 stipulates the Design Organisation Approval holder's responsibilities regarding reporting to DGCA. DGCA processes the reports in accordance with the internal procedure. The form and manner for such reports need to be made following the approved procedure as contained in the Design Organisation Handbook / DOM of the DOA holder.

5.2 Reserved

5.3 Resolution of Disagreements

The DOAT is the primary decision maker in the process under the supervision of the DAED. The DOAT has the ability to take the first decisions to the largest possible extent. If the DOA holder/applicant does not agree with the DOA Team's decision, the DAED will try to find a mutually acceptable solution. If an agreement still cannot be reached, the matter will be brought to the DDG to take a decision thereto.

If further deliberation is necessary then the final decision will be made by the DG. The applicant is informed about the final decision.

5.4 Reserved

5.5 Limitation, Suspension and Revocation

A Design Organisation Approval shall be limited, suspended or revoked by the DGCA if the certificate becomes invalid under the conditions specified in CAR-21, or failure to comply with the DGCA's fees and/or any Regulation.

In case of a level one or level two finding, the DDG shall partly or fully limit, suspend or revoke a design organisation approval as follows:

(a) In case of a level one finding, the DDG shall immediately limit or suspend the design organisation approval. If the holder of the design organisation approval fails to comply with 21. A258(c)(1), the design organisation approval shall be revoked.

(b) In case of a level two finding, the DDG shall decide on any restriction to the scope of approval by temporary suspension of the design organisation approval or parts thereof. If the holder of a design organisation approval fails to comply with CAR 21.258(c)(2), the design organization approval shall be revoked.

The DDG on behalf of the DG shall notify the holder of a Design Organisation Approval in writing about this suspension or revocation including the reasons thereof.

5.6 Communication and Publication

Significant decisions affecting the result of the certification procedure is communicated by DGCA to the applicant in writing.

DGCA decisions related to the issuing, modification, limitation, suspension or revocation of certificates are recorded and kept safely. The DAED makes provision for record keeping.

5.7 Confidentiality of Documents

All documents and information related to the design organisation approval which originates from the DOA holder/applicant and received by DGCA are retained and are subject to protection from disclosure. If the applicant chooses to submit data required to support application in electronic format, then also these data are protected and kept safely.

6.0 Renewal of Design Organisation Approval (DOA)

Renewal of Design Organisation (DO) is granted after carrying out a year-end audit in the month of December ensuring that the Design Organisation has performed the work within the 'scope of approval' which was granted to it and also after ensuring that the DO has not violated any rules/ regulations and has maintained/ submitted all documentation that were necessary.

7.0. Plan of Design Organisation Surveillance

DGCA (AED) officers carry out one surveillance per calendar year of all the Design Organisations (DO) approved under CAR 21, Subpart JB, and two surveillance per calendar year of those Design Organisations approved under CAR 21, Subpart JA as per the procedure given in Surveillance Procedure Manual. The Director (AED) draws up an surveillance plan for the current year in January. The surveillance of the DOs are carried out in a staggered manner to ensure that in the same month the same team of officers do not carry out surveillance of two organisations. The surveillance is carried out as per the 'surveillance check-list' customised to the category of approval of the DO (i.e, CAR 21 JA/JB). Deficiencies identified during surveillance/ inspections are tracked manually. The checklists for surveillance includes item for ensuring that the earlier identified deficiencies have been rectified. The format of non-conformance form is given in ANNEXURE -1 of this part.

NON- CONFORMANCE FORM**Annexure-I**

Company audited:		Date:
Area audited:		
NCF ref:		Category level: 1 / 2 / 3
Auditee:		Auditor:
<p>Findings:</p> <ul style="list-style-type: none"> ○ Evidence: ○ Attribution: ○ Explanation: 		
Signature of Auditor:		Date:
Proposed corrective action:		
Signature of Auditee:		Date:
Review of corrective action:		
Signature of Auditor:		Date:
Remarks of DAED		
Signature:		Date:



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Handbook of Procedures
PART 6

Alternative Procedures to Design Organisation Approval
(ADOAP)

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1 GENERAL

1.1 Introduction

Rule 133B of the Aircraft Rules, 1937 stipulates that organisations engaged in design and manufacture of aircraft, aircraft components and items of equipment including materials, forgings, castings and standard parts, shall be approved by the Director General of Civil Aviation. DGCA may, on request and being satisfied, approve an organisation to operate under the system of approval. For operating under an approved system, the organisation or person shall comply with such requirements as may be specified by the DGCA. The requirements for alternative design organization approval are laid down in CAR-21.

The objective of this part of handbook is to establish the general principles to be followed by DGCA to issue organisation approvals in accordance with the applicable CAR-21 and associated AMC and GM.

1.2 Scope of the Procedure

This procedure describes how DGCA internally handles the investigation of applicant's alternative procedures in the absence of a design organisation approval.

This investigation is performed in accordance with the provisions of CAR 21 issued by DGCA for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations. The investigation is also be performed in accordance with the related Acceptable Means of Compliance (“AMC”) and Guidance Material (“GM”).

1.3 Abbreviations / Terminology

AED	Aircraft Engineering Directorate
AID	Aircraft Inspection Division (Airworthiness Directorate)
AMC	Acceptable Means of Compliance
CAR	Civil Aviation Requirements
DOA	Design Organisation Approval
DOAT	Design Organisation Approval Team
DOA Manager	Design Organisation Approval Manager (DGCA officer)
DAED	Director, Aircraft Engineering Directorate
DDG	Deputy Director General in-charge of AED (for this document only)
JDG	Joint Director General
DG	Director General
DGCA	Directorate General of Civil Aviation
EASA	European Aviation Safety Agency
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
OCP	Organisations Certification Procedure
TL	Investigation Team Leader

1.4 References

- a) The Aircraft Rules, 1937
- b) Civil Aviation Requirements (CAR)-21
- c) Acceptable Means of Compliance (AMC) and Guidance Material (GM) to CAR- 21.

2 APPLICATION AND ALLOCATION OF TECHNICAL INVESTIGATION TASKS

See Part 5 - Design Organisation Approval Procedures (DOAP).

Details about format, address and fees can be found on CAR-21, available on DGCA website.

3 DETERMINATION OF THE ALTERNATIVE PROCEDURES TO DOA APPROVAL TEAM

The same personal attributes as for a DOAT Leader is considered (see Part 5, Design Organisation Approval Procedures (DOAP)).

4 CERTIFICATION PROCEDURE

The investigations follows the procedures described below.

For assessment of the alternative procedure to DOA, the DDG nominates a Project Manager (PM) from the Design Organisation Team of AED in consultation with DAED.

The DAED communicates the name of the PM to the applicant.

The PM involves, if necessary, other DGCA staff engaged in product or article certification activities, and provides feedback. The alternative procedure is evaluated for compliance with the demonstration of capability for design, in accordance with the following paragraphs and associated acceptable means of compliance and guidance material:

- CAR 21.14(b), for type certificates / approval; or
- CAR 21.112B(b), for supplemental type certificates; or
- CAR 21.432B(b) for major repairs; or
- CAR 21.602B(b)(2) for ITSO Authorisations.

The PM also takes into account of all relevant information and related experience of the applicant.

Following evaluation of the procedures and establishment of a compliance check-list, the PM submits an internal note to the DAED. This note establishes compliance with:

- CAR 21. 21(a), for the issue of a type-certificate / approval
- CAR 21.115(b), for the issue of a supplemental type-certificate
- CAR 21. 432B(b) for the approval of a major repair
- CAR 21. 606(a), for the issue of an ITSO Authorisation.

An applicant that has already demonstrated its capability through an alternative procedure to DOA is deemed to have demonstrated its capability within the same scope of work. For an extended or new scope of work, the PM evaluates the necessary updates and re-submits a new internal note, as described above, to the DAED.

The findings of compliance are communicated to the applicant through an official letter.

The list of design organisations having demonstrated their capability for design through alternative procedure to DOA is recorded/ updated from time to time by the DAED.

Changes to the scope covered by the alternative procedure must be handled as a new application (i.e. type-certificate, supplemental type-certificate, major repair design approval, or ITSO Authorisation).

The continued surveillance is carried out through the direct involvement of DGCA officers engaged in product or article certification activities.

5 ADDITIONAL PROVISIONS

5.1 Reporting System

CAR-21 lays down the Design Approval holders responsibilities regarding reporting to DGCA. DGCA processes the reports in accordance with the internal procedure. The form and manner of such reports need to be made following the approved alternative procedure.

5.2 External Experts

If deemed necessary, DGCA may consult external experts / specialists with extensive technical knowledge and experience, necessary for approval of design organizations.

The external experts/ specialists may advice AED on technical certification principles and technical interpretation of the CAR 21, technical standardisation and technical training ensuring appropriate technical certification knowledge to AED officer.

5.3 Resolution of Disagreements

The DOAT is the primary decision maker in the process under the supervision of DAED. The DOAT has the ability to take the first decisions to the largest possible extent. If the DOA Holder/Applicant does not agree with the DOA Team's decision, the DAED will try

to find a mutually acceptable solution. If an agreement still cannot be reached, the matter will be brought to the DDG to take a decision thereto.

If further deliberation is necessary then the final decision would be made by the DG. The applicant is informed about the final decision.

5.4 Reserved

5.5 Limitation, Suspension and Revocation

In case of serious findings related to the design approvals issued under alternative procedures to DOA, DGCA may revoke existing design approvals, or stop issuing new design approvals.

5.6 Communication and Publication

Significant decisions affecting the result of the certification procedure is communicated by DGCA to the applicant in writing.

DGCA decisions related to design organisations having demonstrated their capability for design through alternative procedure to DOA and records are maintained in AED and are kept safely.

5.7 Confidentiality of Documents

All documents and information related to the design organisation approval which originates from the Alternative DOA applicant are received by DGCA and retained. These are subject to protection from disclosure. If the applicant chooses to submit data required to support application in electronic format, these data are also protected and kept safely.



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Handbook of Procedures
PART 7

Approval Procedure of Flight Conditions for issue of a
Permit to Fly.

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1. Purpose:

This internal working procedure describes how DGCA handles the technical process applicable to the approval of flight conditions related to safety of design for issue of Permit to Fly.

2. Scope:

The scope of this procedure is limited to approval of flight conditions relative to aircraft that does not meet, or has not been shown to meet, applicable airworthiness requirements but is capable of safe flight under defined conditions and for the following purposes:

1. development;
2. showing compliance with regulations or certification specifications;
3. design organisations or production organisations crew training;
4. production flight testing of new production aircraft;
5. flying aircraft under production between production facilities;
6. flying the aircraft for customer acceptance;
7. delivering or exporting the aircraft;
8. flying the aircraft for Authority acceptance;
9. market survey, including customer's crew training;
10. exhibition and air show;
11. flying the aircraft to a location where maintenance or airworthiness review are to be performed, or to a place of storage;
12. record breaking, air racing or similar competition;
13. flying aircraft meeting the applicable airworthiness requirements before conformity to the environmental requirements has been found;
14. Reserved; and
15. for non-commercial flying activity on individual non-complex aircraft or types for which a Certificate of Airworthiness or restricted Certificate of Airworthiness is not appropriate.

3. References :

1. CAR 21,
2. Acceptable means of compliance and guidance material for airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations ("AMC and GM to CAR 21")

4. Related Forms:

Refer CAR 21.

5. Definitions and Abbreviations:

AED	Aircraft Engineering Directorate
AID	Aircraft Inspection Division (Airworthiness Directorate)
DOA	Design Organisation Approval
DGCA	Directorate General of Civil Aviation
PCM	Project Certification Manager
CM	Certification Manager

6. Reserved

7. General

Permit to Fly may be issued when it is shown that the aircraft is capable of performing safely a basic flight. It may issued with appropriate limitations, in particular to protect the third parties' safety.

Restrictions applicable to issue of permits to fly are dependant on the following:

- purpose of the flight
- airspace used for the flight
- qualification of flight crew
- carriage of persons other than flight crew.

The list of restrictions to ensure safety is not exhaustive but may also include other restrictions, for example:

- the performance of the aircraft
- the configuration of the aircraft (e.g. flaps extended).

8. Allocation of certification tasks

DGCA- AED carries out technical investigations. The DDG nominates a PCM for the certification task. The PCM in consultation with DDG forms a team for the allocated job.

9. Basic Principles:

9.1. Applicability

A Permit to Fly is generally issued when a Certificate of Airworthiness is temporarily invalid, for example as the result of a damage, or when a Certificate of Airworthiness cannot be issued for instance when the aircraft does not comply with the essential requirements for airworthiness or when compliance with those requirements has not yet been shown, but the aircraft is, nevertheless, capable of performing a safe flight.

In order to obtain a Permit to Fly, the applicant shall make sure that the flight conditions are approved.

The flight conditions are approved under a approval process which requires an application to DGCA in a prescribed form given in CAR 21.

9.2. Responsibilities

Flight conditions are approved by AED of DGCA.

The different types of approvals are:

1. approval of flight conditions related to safety of design and Permit to Fly
2. approval of flight conditions not related to safety of design and Permit to Fly.

These are discussed in following paragraphs.

9.3. Approval of flight conditions by DGCA.

9.3.1. General

DGCA approves the Flight Conditions in cases **related to the safety of design**, defined as follows:

1. The aircraft does not conform to an approved design; or
2. An Airworthiness Limitation, a Certification Maintenance Requirement or an Airworthiness Directive has not been complied with; or
3. The intended flight(s) are outside the approved envelope.

DGCA makes the findings that if appropriate, grants approval to flight condition of the aircraft with appropriate associated restrictions which compensates for non-compliance of the essential requirements of aircraft to perform a safe basic flight.

9.3.2. Flight conditions related to safety of design

The applicant has to apply to AED of DGCA for approval of flight conditions related to safety of design in the following cases:

1. Where the flight conditions related to safety of design are not approved at the time of application for a Permit to Fly; or
2. Where the applicant has not been granted the adequate privilege to approve the flight conditions related to safety of design.

The applicant submits a justification note following along with applicable DGCA forms.

An approval of flight conditions cannot be issued before all forms have been filled in by the applicant and provided to DGCA in time.

9.3.3. Flight conditions not related to safety of design

When the flight conditions are **not related to the safety of design**, then also DGCA 's approval is required.

In such cases, the flight conditions are approved by DGCA. Examples of such conditions are:

1. Production flight testing for the purpose of conformity establishment;
2. Delivery / export flight of a new aircraft, the design of which is approved;
3. Demonstration of continuing conformity with the standard, previously accepted by DGCA for the aircraft or type of aircraft, to qualify or re-qualify for a (restricted) Certificate of Airworthiness.

9.3.4. Technical procedure

9.3.4.a) General

The Project Certification Manager (DAED) is responsible for conducting the technical investigation based on which the DDG makes his decision to issue, to amend or to refuse the approval of the proposed flight conditions or changes thereto.

9.3.4.b) Task allocation

The DDG nominates a PCM (DAED) or any other officer to conduct the technical investigation. The DAED nominates Certification Manager (CM) after consultation with the DDG.

The technical review, in particular, with regard to available resources and assumed workload, is made during the meeting between the officers and the DAED.

The normal time between the date of receipt of the application and the first day of the validity period for the related Permit to Fly is **less than or equal to 20 working days**. The technical investigation is evaluated by the responsible officers, immediately upon receipt and acceptance of the application.

In principle, the PCM of the product type is nominated to conduct the technical investigation, except where the responsible officer or Head of Department decides otherwise, for example, in the event of non-complex applications or time constraints or pre-occupation of the concerned officers.

The Project Certification Manager may request the involvement of any officer from other Directorate, where their technical expertise is required.

9.3.4.c) Technical investigation

The proposed flight conditions and substantiation documents provided by the applicant are checked. Before approving the flight conditions, AED must be satisfied that the aircraft is capable of a safe flight under the specified conditions and restrictions and may advise the applicant to make any necessary inspections or tests for that purpose.

In the event of compliance finding, a statement is issued by the Certification Manager (CM). Based on the observation submitted by CM and technical data & information submitted by the applicant, the DAED, through an internal note, submits to the DDG for approval. If satisfied, the DDG gives his approval of the flight conditions.

10. Interface with other activities:

10.1. Issuance of Permit to Fly

Simultaneously or following DGCA approval of flight conditions, applicant sends an application for a Permit to Fly to DGCA prescribing the identification marks, along with appropriate DGCA Form. After examination of the submitted documents, if found satisfactory, permit to fly may be granted by DGCA.



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Handbook of Procedures
Part 8

VALIDATION / ACCEPTANCE OF TYPE CERTIFICATE
ISSUED BY FOREIGN AUTHORITY

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1.0 Introduction :

DGCA is empowered vide Aircraft Rule 49B to revalidate the type certificate, in respect of any aircraft/helicopter/aircraft engine/propeller that may be imported, provided that:

- (a) the airworthiness authority of the country in which it is manufactured has issued the certificate of airworthiness, type certificate or similar document, in respect of that aircraft/ helicopter or components;
- (b) it meets the airworthiness requirements and special conditions laid down by the DGCA.

In accordance with this rule the complete procedure of Validation of Type certificate for an aircraft is followed.

Validation is required in following cases :

- i) if the imported product is type certificated by any foreign regulatory authority and the Indian applicant intends to manufacture the product in India under license from foreign manufacturer;
- or
- ii) if the imported product is type certificated by a CAA other than EASA or FAA and the prospective Indian operator intends to operate the aircraft in India.

2.0 Procedure for revalidation of Type Certificate of imported products :

2.1 General

In accordance with Civil Aviation Requirements (CAR), section 2, series F, part II, for Validation of Type certificate the applicant submits the following documents :

- (i) Type Certificate,
- (ii) Type Certificate data sheets,
- (iii) Supplemental type data sheet, if applicable.
- (iv) Noise standard to which it has been certified,
- (v) The basis on ETOPS certification if applicable,
- (vi) All applicable Airworthiness Directives,
- (vii) Copies of aircraft engine, propellers, specifications, special conditions and/or exemption including the certification basis.
- (viii) Engineering description of the aircraft with required illustrations.
- (ix) Copies of selected flight test reports,
- (x) Copies of maintenance review board report and MMEL for aircraft type certificate in transport category,
- (xi) Weight and Balance report, Flight manual, Structural Repair manual etc.
- (xii) Compliance statements, type design record and any other reports required by the DGCA.
- (xiii) Appropriate Filled DGCA form with requisite amount of fees as per the provisions of Rule 62 of the Aircraft Rules 1937 and CAR-21.

The design documents submitted by the applicant are scrutinized by AED. In order to familiarize with the design and certification procedures, design representative of the manufacturer may be required to visit India to acquaint DGCA officials with the systems and design of the product. Alternately, representatives of DGCA may visit the design/ manufacturing sites to discuss specific design/ manufacturing issues with the designer and/or Aviation Authority of the country of design/manufacture and audit the foreign design organization holding the Type certificate of the product. The checklist of audit of foreign design organization can be referred at Annex I of this part.

As per CAR 21.16B special conditions may be imposed on foreign Type Certificate and Type Certificate Data Sheet by DGCA in specific cases for safe operation of the aircraft in India. The special conditions so imposed, will be communicated to the manufacturer and the respective Aviation Authorities by DGCA.

Considering the high ambient temperature conditions in India, the applicant is required to provide system performance and aircraft performance certified by the foreign airworthiness authority at ambient temperature up to 50⁰C at S.L. and high altitude airports (>10000 feet).

On being satisfied that the basis of Type Certification of aircraft/ helicopter/ aircraft engine/ propeller is satisfactory and meets the requirements prescribed in CARs of DGCA, DGCA may revalidate the Type Certificate (with such exception as may be granted) issued by Aviation Authority of the country in which the product has been manufactured. Additional conditions, operating limitations may be imposed by the DGCA.

2.2 Procedure for Validation of a Type Certificate

Internal Procedure to be followed for Validation of Type Certificate is same as the procedure for issue of Type Certificate as described in Part I of this Handbook of Procedures.

3.0 Procedure for Acceptance of a Type Certificate:

As DGCA accepts design codes of FAA / EASA, generally the Type Certificates issued by FAA/ EASA are considered acceptable by DGCA. However, as indicated in para 21.16B of CAR 21, DGCA may impose 'special conditions' for safe operation of aircraft in India.

Type Acceptance is granted in the following cases if:

- a) an imported aircraft is type certificated by FAA/ EASA;
- b) the similar type designed aircraft has not been not granted Type Acceptance / entered in Indian Civil Aviation Register ; and
- c) an operator desires to opera *te the aircraft in India.

In such cases, the complete procedure of validation of Type Certificate as per 2.0 of this part of Handbook is not followed and Type Acceptance is granted to the imported aircraft for operation in India. The DAED ensures that the applicant, who is the Type Certificate holder of the product, submits the following information/documents in respect of the aircraft for which the Type Acceptance is to be granted:

1. Type Certificate;
2. Type Certificate Data Sheet;
3. Approved Aircraft Flight Manual;
4. Compliance with special condition such as novel or unusual design features in the aircraft and substantiation reports;
5. Test reports related to high intensity radiation field (HIRF) effects;
6. Status of mandatory instruments and equipment as per applicable Civil Aviation requirement (CARs) of DGCA;
7. Operational capability from high altitude (>10000 feet) airports;*
8. capability to operate at high ambient temperatures, (+50°C at Sea Level);
9. Additionally, the aircraft has to meet the noise and engine emission standards prescribed in ICAO Annex 16 or equivalent standards as of date;
10. Letter of intent from prospective Indian customer;
11. Substantiation documents providing the basis for 'Equivalent Safety Findings' and 'Exemptions';
12. Substantiative documents giving Information regarding Engine Reliability;
13. Substantiative documents regarding Accident/incident information; and
14. Any other information that DGCA deems necessary.

* This requirement is applicable for pressurised aircraft. For non pressurised aircraft, this requirement can be relaxed on case to case basis, subject to approval of Joint DGCA.

After all the documents are received, the same are examined and if found satisfactory an official letter of acceptance is issued to the applicant for the said aircraft to operate in India. The checklist for acceptance of foreign aircraft may be referred at Annex II of this part. Refer to the Aircraft Rules, 1937 for provision of fees.

4.0 Certification of aeronautical products under the frame work of BASA:

In case of a Bilateral Aviation Safety Agreement (BASA) including the associated implementing procedures (IP) or any working agreement, this agreement may supplement, change or supersede the above certification procedures. In this case, DGCA certification may be called validation and it is assumed that the imported product shall meet, with the same level of confidence, a level of safety equivalent to that required for a comparable product designed and manufactured within India.

ANNEX- I**CHECK LIST FOR AUDIT OF FOREIGN DOA
(FOR VALIDATION OF TC)**

S.No	Queries/ checklist items	Observations/ Remarks
1	What are the State's Rules/ regulations (equivalent to EASA part 21/ FAR 21) as per which DOA was obtained?	
2	Which part/ sub-part of the regulation(s) provide the scope for issuing DOA?	
3	When the DOA was obtained? A copy of the DOA certificate/ letter be obtained and examined.	
4	A copy of the approved DOM/ DOE (for reference only) may be examined.	
5	What is the 'scope of approval' as per the DOA certificate/ letter?	
6	What is/are the privilege(s) of the DOA holder?	
7	Does the regulation call for a 'Design Assurance System' to be in place within the DO?	
8	Other than the present case (aircraft, engine or propeller as the case may be) any other major products produced for which TC have been issued. If yes, a list of the same.	
9	Has the DO been subjected to 'continued surveillance' by the regulatory authority of the 'state of design'?	
10	Has the DOA ever been revoked, suspended, etc. for a level 1 offence? If yes, provide details.	
11	Whether a proper 'reporting system' in the DO exists for reporting to the authority including reports on faults/ malfunctions/defects on the products (designed by the DO under TC) in service?	
12	Whether the areas within the 'Design Assurance System' are subjected to periodical internal/ external audits? If yes, whether records of the same are maintained?	
13	Have 'design subcontractors' been engaged for component/ part design? If yes, a list of the same may be examined. Whether proper legal working arrangements have been signed from accountability (continued airworthiness) point of view?	
14	What is the 'internal procedure' of the DO for monitoring/ surveillance of those subcontractors? Is the procedure mentioned in the DOM/ DOE?	
15	Does the 'working arrangement' with the design subcontractors allow easy access of concerned officials from the regulatory authority?	

ANNEX II**Checklist for acceptance of foreign aircraft**(In cases where Type Certificate (TC) has been issued by either **FAA** or **EASA**)

Sl.No.	Checklist Items	Remarks
1	Name of Airplane/Helicopter/Balloon	
2	Type of aircraft (fixed-wing / rotary wing).	
3	Whether transport category/ others .	
4	Name of Engine	
5	Type of Engine	
6	Number of Engines	
7	Max. All-Up-Weight(AUW) of Airplane/Helicopter/Balloon)	
8	Request letter from TC holder of the aircraft to DGCA (AED) for acceptance of subject aircraft mentioning the <u>type of operation intended</u> (with enclosures as mentioned below).	
9	<u>Letter of intent</u> from a bona fide Indian customer/ operator.	
10	Type Certificate of the aircraft (TC).	
11	Type Certificate Data Sheet (TCDS).	
12	Approved Aircraft Flight Manual (AFM).	
13	Compliance document against <u>special conditions</u> such as novel or unusual design features in the aircraft.	
14	Information related to high intensity radiation field (HIRF) effects .	
15	Whether fitted with mandatory instruments and equipment as per applicable Civil Aviation requirement (CARs) of DGCA	
16	Operational capability from high altitude (>10000 feet) airports (Indian operational terrain condition).	
17	Capability to operate at high ambient temperature, (+50°C at Sea Level) (Indian operational terrain condition).	
18	Documents to show that the aircraft meets the noise and engine emission standards prescribed in ICAO Annex 16 or equivalent standards as of date.	
19	In cases, where TCDS indicate 'Equivalent Safety Findings' and 'Exemptions', then substantiation documents providing the basis	
20	Substantiating documents giving Information regarding Engine Reliability.	
21	Substantiating documents regarding Accident/incident information.	
22	Examine all the above information/ documents	
23	Name of the officer scrutinising the case	
24	Designation of officer	
25	Signature	
26	When found satisfactory prepare a detailed note recommending for the acceptance and submit to DAED.	
27	When approved, prepare 'letter of type acceptance', get the same signed by DAED and get the letter issued.	



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Handbook of Procedures

Part-9

Procedure for ITSO Authorisation

Indian Technical Standard Order Authorisation Procedures

1. Purpose:

The purpose of this document is to define the roadmap to be followed by the certification team for ITSO Authorization of Parts & Appliances in accordance with the provisions of sub part 'O' of CAR 21.

2. Application:

- a) The applicant shall apply for ITSO authorisation on a prescribed format (Form CA- 34) along with the requisite fee.
- b) The application (Form CA-34) in duplicate along with all technical data/ documents required under CAR 21.605 and data specified in application ITSO shall be submitted to regional DAW/CAW office. DAW/CAW office shall forward one copy of this application to JDG/DDG (AED).

If, ITSO has not been issued, the applicant may submit an FAA TSO/EASA ETSO standard with the application, for reference.

- c) Immediately after receiving the formal application, certification team shall be constituted by JDG/DDG (AED) within 15 days. The certification team headed by Director (AED) shall consist of two groups i.e. Design group and Inspection group. The certification team will be headed by a project manager.
- d) Thereafter, the application will be acknowledged.
- e) After receiving the application and formation of certification team, a preliminary visit shall be made for taking general overview of the design and manufacturing facilities. The manufacturer should make a presentation to the certification team.

3. Document Review and Scrutiny of Technical Data:

- a) The certification team shall check the application for eligibility in accordance with CAR 21.602.
- b) The design group of certification team will review the submitted technical data for compliance with the applicable ITSO standard.
- c) The applicant will be informed within 30 days if the technical data/documents furnished with the application are complete.
- d) The applicant should submit the additional supporting data when requested by DGCA.

- e) The document review process by design group should be completed within 60 days of the formation of certification team. The design group will check the adequacy and validity of technical data and ensure its compliance with the applicable ITSO standard.
- f) The responsibility of applicant's production capability rests with Airworthiness Directorate in accordance with CAR 21.605 (d). Regional DAW/CAW office shall submit the report on the applicant's production capability alongwith their quality control system to AED (Hqrs) within 60 days.
- g) After ascertaining the following,
- Adequacy and validity of technical data
 - Compliance with the applicable ITSO standard
 - Demonstration of production capability by the applicant (QC system)
 - In case manufacturer requests approval to deviate from any performance standard of an ITSO, the equivalent level of safety shall be ensured.

the certification team shall approve 'Certification Plan'. If the certification team finds any deviation at this stage from any performance standard of an ITSO, the team shall make decision for approval or rejection of the project.

- h) The applicant should submit the Test Plan to DGCA for reviewing 30 days ahead of the tentative testing date.
- i) The inspection group shall visit the manufacturing organisation for witnessing the performance and environmental tests.
- j) When applicant completes all of the design calculations and tests based on the approved certification test plan, the applicant shall submit all related documents like consolidated test report to DGCA.
- k) In case of articles requiring specialized skills, specialists from outside agencies may be appointed for this purpose.

4. Deviations:

Deviations must be applied for, according to CAR 21.610 and should be submitted to project manager who will review them and inform the JDG/DDG. The deviations should be handled in the same manner as application and must be approved by the JDG/DDG.

5. Demonstration of capability for design:

The demonstration of capability for design required in CAR 21.602B (b) will be assessed by the design group of certification team. See the relevant checklist.

6. Demonstration of capability for production:

For the demonstration of capability for production, the Project Manager will check the existence of a CAR 21 production approval under subpart F or G, or coordinate with the regional office of DAW in order to have such approval issued on time and prior to ITSO authorisation.

7. Issue of ITSO Authorisation:

When the compliance document is completed to the satisfaction of the project manager and proposed deviations, if any, accepted in accordance with CAR 21.610, the project manager will submit the following to the JDG/DDG (AED)

- (a) Technical visa
- (b) Compliance statement of the applicant
- (c) DDP
- (d) Compliance summery

After reviewing the above documents JDG/DDG will instruct the project manager for submitting the ITSO authorisation certificate for favour of signatures. Once ITSO authorisation is issued, the manufacturer is authorised to mark the appliance with the ITSO marking.

8. Design Changes:

The project manager will acknowledge receipt of minor changes identified by the ITSO authorisation holder in accordance with CAR 21.611(a). He will also review the minor changes to verify the classification.

9. Installation Approval:

An ITSO approval does not include installation approval. Installation approval may require TC/STC or field approval.

10. Record Keeping:

All relevant design information, drawings, specifications and qualification test reports preserved by the manufacturer till such time he holds ITSO authorisation. Upon surrender/revocation of certificate of ITSO authorisation, the manufacturer shall be asked to send copies of all these records to DGCA. Production inspection records of each article manufactured shall be retained for at least 2 years.



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PART 10

FLIGHT TEST GUIDE

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SUB-PART I

FLIGHT TEST GUIDE FOR TYPE CERTIFICATION OF AIRCRAFT

1 GENERAL

1.1 INTRODUCTION

An organisation responsible for design and development of a prototype aircraft or modification of an approved aircraft shall establish the desired values of various aircraft parameters, by conducting flight tests pertaining to performance, flight characteristics and equipment operations. The organisation shall establish the operational limitations, procedures and information for the aircraft under consideration. The flight testing of prototype aircraft under consideration for the issue of type certificate or amendment to type certificate/STC shall comply with the procedures set out in this chapter.

The organisation shall demonstrate conformity with the type design parameters through extensive flight testing for grant of a Type Certificate by DGCA.

The flight tests for the evaluation of a new Type design or in respect of an aircraft that has undergone major modifications affecting the basic design shall be carried out by test pilots and observers duly approved by DGCA. For this, details about the qualification, and experience of these personnel will be intimated to DGCA. The qualification and experience requirements for approval of test pilots are given in Part V of this Handbook.

1.2 DEFINITION

Type Certificate: A Type Certificate is a document, issued by DGCA, that constitutes a statement that the design of the aircraft type covered under this certificate and of the variants specified on the Data Sheet has been approved by DGCA.

2 PROTOTYPE AIRCRAFT

2.1 Preparation:

- 2.1.1 At the early stage of design, the applicant Organisation shall provide an assembly drawing of the aircraft and engine type certificate data sheet, together with a description of any unusual design features to the DGCA. Certain features of the aircraft (e.g. pilot's view, accessibility of cockpit controls) shall be demonstrated to the DGCA using a 'mock-up' or other acceptable representation of the aircraft.
- 2.1.2 The provision of special equipment that may be required for purposes of the flight trials, e.g. safety harnesses, parachute stowages, emergency exits, anti-spin parachutes and instrumentation, etc. and the means for overriding or disconnection of automatic devices shall be discussed with the DGCA, giving sufficient time to enable the DGCA to take appropriate action during the design and construction stages of the aircraft.

2.2 Flight Trials:

- 2.2.1 Before the commencement of flight trials, aircraft shall be offered to DGCA –AED for inspection.
- 2.2.2 The flight trials will normally start after the completion of the scrutiny of design documents including design reports analysis, wind tunnel test reports, structural test reports, etc., relating to the development of prototype aircraft and their acceptance by DGCA.
- 2.2.3 The prototype shall, in all relevant aspects, be in a condition fully representative of the type when the flight trials are carried out. A statement identifying the design standard at the commencement of these trials shall be given to the DGCA, together with details of any significant variations in the design from the same, if any. The statement shall include sufficient detail to identify the design and modification of the aircraft and shall include all limitations including temporary limitations, applicable to the trials.
- (a) Any design changes made to the aircraft during the flight trials (e.g. incorporation of modifications, adjustments to powerplant, control surfaces and general rigging) shall be notified to the DGCA, and the statement shall be amended, as necessary, to reflect the development state of the aircraft. Both the original statement and each amendment thereto shall be dated and signed by the Applicant/ organisation.
- (b) Where any design change makes an earlier flight test invalid, the concerned flight test shall be repeated.
- 2.2.4 The applicant shall submit, for approval, a flight test schedule containing details of the proposed flight tests to be included in the flight trials. This schedule shall include the flight tests necessary:
- (a) To establish compliance with all the applicable airworthiness requirements.
- (b) To provide information for inclusion in the documents associated with the type certification.

NOTE:

1. The DGCA may require alterations to the flight test schedule and may also require additional tests not included in the schedule if it appears that such tests are necessary to establish the airworthiness of the aircraft type.
 2. For development of flight test schedules and method of conducting test flights, the applicant should use the applicable Advisory Circular (latest) to the design standard being used e. g., AC 23-8A for aircraft designed to FAR-23 requirements and AC 25-7 for airplane designed as per FAR-25 requirements. For helicopters, AC 29-2A for large helicopters should be followed.
- 2.2.5 At a reasonable time before the commencement of the flight trials, the applicant shall provide the following information and shall notify any subsequent alterations thereto.
- (a) A summary of the predicted aerodynamic characteristics which require to be checked during the flight trials (stalling speeds, control force characteristics, aircraft response etc.).
- (b) Aircraft performance estimates.

- (c) A statement indicating the airworthiness conditions and the type of operations with which it is proposed to establish compliance. As appropriate to the capability and intended use of the aircraft this statement shall include, but may not necessarily be confined to, information concerning:-
- i. Category (ies) for which certification is/are requested.
 - ii. Performance group(s)/class.
 - iii. Weight-C.G. envelop.
 - iv. Flight in non-temperate conditions.
 - v. Flight in icing conditions.
 - vi. Instrument flight.
 - vii. Flight by night
 - viii. Use of oxygen.
 - ix. Use of cabin pressurisation.
 - x. Speed limitations.
 - xi. Carriage of external loads.
 - xii. Search and rescue.
- (d) Details of the special instruments fitted to the aircraft for the purpose of the flight trials.
- (e) Details of the aerodromes, atmospheric conditions, aircraft weights and other relevant details relating to the proposed test conditions for the flight trials.
- (f) Details, by reference or in full, as applicable, of the methods of correction of test flight results.
- (g) Such other information as the DGCA may require, e.g, flight test techniques, methods of instrument calibration, methods of presentation of flight test results, and the methods of preparation of handling and performance information.
- 2.2.6 The applicant shall intimate to the DGCA in advance so that DGCA representatives have enough opportunity:
- (a) to get familiarized with the aircraft and systems prior to the flight trials;
 - (b) to participate in these trials;
 - (c) to make flight test assessments during or after the flight trials;
 - (d) for scrutiny and acceptance of flight test schedules.
- 2.2.7 The applicant shall intimate to the DGCA well in advance of the date on which it is proposed to commence the flight trials.
- 2.2.8 The aircraft shall be tested in accordance with the approved flight test schedule.
- 2.2.9 The speeds to be used in the performance tests shall be specified and shall be compatible with those obtained during the handling tests.
- 2.2.10 As the flight trials proceed, the applicant shall provide the DGCA with flight test reports (duly signed by the test pilot) which, when all the flight trials are completed, will give full particulars and results of all tests specified in the flight test schedule. The flight test reports shall bear a reference number and shall include the following particulars in respect of each test:

- (a) The purpose of the particular test, indicating the relevant requirements with which compliance is to be established.
- (b) The relevant test conditions (e.g. loading and configuration of the aircraft, atmospheric and weather conditions).
- (c) A description of the technique used for the flight test.
- (d) The relevant behaviour of the aircraft when subjected to the test.
- (e) The readings taken during the test together with the corrected results.
- (f) The conclusions drawn from the test, including compliance claimed.

2.3 TOTAL FLYING HOURS FOR CERTIFICATION

- 2.3.1 The minimum number of flying hours to be completed before certification shall be agreed with the DGCA. In reaching agreement, account will be taken of the design features of the aircraft, and credit may be given for flying completed in course of development and during the flight trials. The DGCA shall be consulted before the commencement of the flight trials so that a suitable program may be agreed.
- 2.4 The aircraft shall be available for repetition of any of the scheduled flight tests or any additional tests that the DGCA may consider necessary at any time before the completion of certification program.

3 GUIDELINES FOR CONDUCTING TEST FLIGHTS

- 3.1 Test pilot must get himself familiarised with the aircraft including its design features, limiting speeds, operating limitations, normal and emergency procedures, performance, aircraft systems, weight and C.G., etc. Flying on motion or non-motion simulators of aircraft (if available) would be recommended prior to flying the prototype.
- 3.2 Test pilot/ flight crew should be briefed about-
 - the objectives of the flight test,
 - the test procedures, test cards, and test sequence,
 - design limits ('g' values and speeds), cross wind component, permissible manoeuvres, etc.
 - recovery from unusual attitude must be effected at a safe height as specified in the test program.
- 3.3 To start with, the test pilot should carry out normal ground handling and flight handling tests. Only after getting familiarised with the ground handling and flight handling characteristics, flight tests, after proper briefing from the designer/ test engineer, should be carried out. Pilot should open up flight envelope in a gradual manner in consultation with the designer/ DGCA.
- 3.4 At any given time if any deficiency/ unsafe condition is noticed, the test flight should be discontinued and the matter be reported to the DGCA for investigation and corrective action.

- 3.5 The test flight schedule should be drawn in line with flight test specifications drawn up by the design group and approved/ recommended by the DGCA.
- 3.6 The test flights should be conducted for each appropriate combination of all up weight and centre of gravity (C.G.) positions in the total range of loading conditions for which certification is requested, authorised for the type of aircraft, keeping in view the limitation imposed by the factors like aerodrome altitude/ temperature, runway length etc..
- 3.7 The aircraft should be properly instrumented for test flight and the instruments be calibrated before installation. The radio equipment functions correctly as installed in the aircraft and the operating range is satisfactory.
- 3.8 Design/ Production organisation shall provide an approved test flight schedule and the detailed procedure to be followed/observed, while performing the flight test.
- 3.9 It is also to be ensured that no passenger other than personnel required for the operation of the flight are on board for the said test flight.
- 3.10 Engineers and the design personnel, who are required to observe the test flight with the specific written permission of the management of the organisation, may be permitted on board during the test flight.
- 3.11 Prior clearance from ATC is necessary before the test flight.
- 3.12 It is required that before carrying out the test flight, all necessary arrangements for fire fighting, casualty clearance and other provisions are kept standby where such flight is undertaken.
- 3.13 Spin recovery parachutes should be installed on all aircraft requiring spin testing for certification in consultation with DGCA. In addition, such installations may be required for other high angle of attack tests on aircraft where inadvertent spins or deep stalls are likely during testing.
- 3.14 The project test pilot(s) should make sure all necessary safety equipment is provided and that all crew members know and are briefed in the usage of this equipment. The pilot(s) should anticipate the possible emergencies that could occur for particular test phase and outline crew duties in the event an emergency is encountered.
- 3.15 Before the flight test is made, the Chief Inspector/ Quality Control Manager shall release the aircraft for flight test, after ensuring that all requirements of Aircraft Rules and those laid down by the Director General of Civil Aviation such as Civil Airworthiness Requirements have been complied with.
- 3.16 Besides, the other instructions, guidelines and test procedures prescribed by the design group/ flight test group for conducting test flights should be adhered to.

Note: Organisation is required to arrange adequate insurance to cover damages to the aircraft and to third parties as a result of flight tests with the aircraft.

SUB-PART II**SERIES AIRCRAFT- FLIGHT TESTING FOR THE ISSUE OF CERTIFICATE OF AIRWORTHINESS****1. INTRODUCTION:**

Flight tests of series aircraft shall be conducted to establish that the handling characteristics are satisfactory, climb performance data matches well with the Type Certificate Data Sheet, the aircraft and its equipment function satisfactorily and the additional requirements, where applicable, have been complied with.

The qualifications and experience of test pilot and other personnel involved in flight testing shall be intimated to the DGCA for approval.

2. PRODUCTION FLIGHT TEST SCHEDULE:

The flight tests shall be conducted according to the Production Acceptance Flight Test Schedule prepared by the Design Organisation and duly approved by the DGCA.

The test schedule shall contain details of the aircraft type to which it refers, registration number, issue number, and date, and shall include the following:

- i. Tests to check performance;
- ii. Tests to check handling qualities of the aircraft which shall include a qualitative assessment of the take-off, an assessment of the trim of the aircraft, the effectiveness of primary flight controls and trimmers in steady flight, hover manoeuvres for helicopters, flight at maximum speed, stalls in the take-off and landing configuration, a qualitative assessment of landing and any other assessment as the need arises;
- iii. Tests to check functioning of the aircraft equipment in flight;

3. GUIDELINES FOR CONDUCTING TEST FLIGHTS

Refer para 3 of sub-part I of this part for detail guidelines.



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Handbook of Procedures
PART 11

GUIDELINES FOR AED-OFFICERS

GUIDELINES FOR THE OFFICERS OF AED TO EXAMINE THE SUBSTANTIATING DESIGN DOCUMENTS RELATED TO ANALYSIS, STRENGTH TESTING AND CERTIFICATION TESTING FOR SHOWING COMPLIANCE WITH AIRWORTHINESS STANDARDS/ REQUIREMENTS FOR THE PURPOSE OF ISSUE OF TYPE CERTIFICATE/ TYPE APPROVAL, ETC.

A) Scrutiny of Substantiating Compliance Document:

Officer in receipt of documents, pertaining to an aircraft for which application has been submitted to DGCA for issuance of a Type Certificate, should proceed as follows and verify that:

1. The Applicable Airworthiness Requirements for the product from the application form for the same and Type Certification Basis Table finalised after discussions with Design Organisation.
2. The reference to the applicable airworthiness requirements should be quoted on the cover page of the substantiating document.
3. The signatures of the officials preparing, checking and approving the document should be checked. It is to be seen that the names of the three officials are different. The name of official responsible for approving the document should have been approved as “authorized signatory” by DGCA or Chief of Design and the name should be checked from Design Organisation Manual submitted by the Organisation.
4. The document should be checked from the point of view whether it provides with relevant information/substantiation material to comply with the applicable airworthiness requirement(s) partially or wholly. If the document shows compliance partially, then the officer should make a note of it and look for other substantiating document (s) showing compliance to the remaining portion of the requirement. Substantiating documents must be complete in all respects.
5. Calibration data of test equipment, test set-up, co-ordination of test by DGCA representative, whether test carried out as per approved test order/test specification or deviated from approved test order, any unusual deviation of data, etc. should be verified for correctness of the test results.
6. Officer should check for the correctness of the formulations and methodology utilised in analysis/calculations from the Advisory Circular/MIL Hand Book/Guidance Material issued by DGCA or other Civil Aviation Authorities. If possible data should be compared with the already established data of same class of products to arrive at a logical conclusion about the correctness of the data.
7. If any deviation from requirement is observed in the document, the same should be discussed with Senior Officer(s) for clarification on the same. The communication with design organisation, if required, should be made with the approval of DDAED/DAED/DDG on file note-sheet with details written thereon.
8. Finally compliance statement documents should be checked for completeness and accuracy and for signatures of the persons authorised to sign the documents.

B) Approval of Qualification Test Schedules:

Officer in receipt of Qualification Test Schedule, pertaining to an aircraft instrument/equipment for which application has been submitted to DGCA for issuance of a Type Approval, should do the following:

1. Officer should get himself familiarized with instrument /equipment with the help of drawing, design documents and discussion with designer (s) and senior officers.
2. The types of tests required to be conducted on that particular instrument/equipment. The guidelines for the tests may be seen as given in RTCA DO – 160 D or MIL specifications/ TSOs issued by FAA.
3. The order of tests should be as per the guidelines given in the RTCA/MIL/TSO.
4. Adequacy of the Test equipment/test facilities for the Qualification testing of equipment/instrument should be verified by visiting the proposed test facility.

C) Witnessing of Qualification tests/Ground test:

Officer proceeding to witness Qualification tests/Ground test should proceed as follows:

1. He/ She has familiarized himself fully with the test procedures.
2. Should ensure before the start of test that all the test equipment have valid calibration tag.
3. He/ She should ensure the presence of authorized Quality Control Manager during the test.
4. Officer need not participate during entire test duration, but he/she should witness the critical phases of the test and functional tests carried out after a particular test.
5. Any abnormality noticed, should be brought to the notice of Chief of Design and Chief of Quality Control.
6. Officer returning after witnessing a qualification test/ground test should submit the brief details of test witnessed and observations pertaining to the test to DDAED/DAED in writing.



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PART 12

ADVISORY CIRCULARS- AED

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ADVISORY CIRCULAR NO. 01 OF 2001**Approval of Test Pilots****1. INTRODUCTION:**

- 1.1. Flight testing of Prototype, Production and In-Service aircraft needs to be undertaken for assessing the characteristics, performance and functioning of various systems to determine whether they meet the prescribed standards. The conduct of these flight tests may encounter unforeseen and difficult situation and thus requiring a very high degree of training and piloting skill. In this connection Indian Aircraft Rule 6C empowers the DGCA to authorise the holder of a licence to fly the aircraft not entered in the aircraft rating of the licence, for the purpose of testing or for specific purpose non revenue, non passenger carrying flight subject to the terms and conditions of such authorisation, and the authorisation shall be limited in validity of the time needed to complete the flight testing or the specific flight: Provided that the holder of the licence produces evidence to show that he meets the requirements of competency as laid down by Director General for undertaking such flight. This Advisory Circular has been issued in accordance with the requirements of this rule.
- 1.2. This Advisory Circular specifies the requirements to be met by test pilots before they can be considered for authorisation by the DGCA under Sub rule 6C to undertake test flights of:
- a. **Prototype aircraft;**
 - b. **Production aircraft; and**
 - c. **In-service aircraft.**

2. REQUIREMENTS FOR AUTHORISATION OF TEST PILOTS:**2.1. PROTOTYPE AIRCRAFT TEST FLIGHTS:**

- 2.1.1. Prototype test pilot should have current Commercial Pilot Licence [CPL (Aeroplanes)/ CPL(Helicopters)] as applicable.
- 2.1.2. The pilots seeking approval for conducting test flights of prototype aircraft must have successfully qualified as an experimental pilot for Fixed/Rotary Wing as applicable from a recognised test pilot school such as ETPS, U.K; EPNER, France; PIUXT River ETPS Air Force test pilot school, USA; or the ASTE, Bangalore, India.
- 2.1.3. The prototype test pilots must have the engineering/developmental flight test experience for the purpose of establishing the basic airworthiness of aircraft or component or parts in the experimental/developmental stage. A military experience would be acceptable provided the applicant has a proper knowledge of Civil Aviation

Requirements, Standards and practices. For this purposes he will be required to pass the oral examination to be conducted by DGCA.

- 2.1.4. The test pilots must have the experience including the basic stability, controllability and performance testing to determine compliance with civil requirements. The prototype test pilot should involve in understanding the aircraft systems, operating limitations, ground handling and flight handling characteristics, normal and emergency procedures and performance of the aircraft, well in advance in the developmental stage.
- 2.1.5. Prototype test pilot should have a minimum of three years flight test experience of working in a reputed flight test organisation. In addition, he should have made three take-off and landing during the last 90 days as a familiarization training in a piston/propeller/jet aircraft as applicable.

The following experience may be considered while approving the test pilot for test flying the prototype aircraft.

The experience in production quality control testing of airworthiness certificated aircraft or flight testing of overhauled aircraft or equipment for which the basic airworthiness has already been established (maintenance tests).

- 2.1.6 Test pilots must have the following minimum experience;

1.	Total flight time	-	1750 hrs
2.	Flight time as Pilot-in-Command (PIC) on all types	-	1150 hrs
3.	Instrument flight time (simulated and actual)-		75 hrs
4.	Night flight time	-	75 hrs
5.	Total flight time during preceding three months	-	10 hrs

- 2.1.7 Normally the test flights are carried out in VFR (Visual Flight Rules) conditions. In case the aircraft is to be flight tested for clearance of IFR (Instrument Flight Rules) operations, the prototype aircraft test pilot should have current IFR rating.
- 2.1.8 Prototype test pilots must possess a valid certificate of medical fitness acceptable to Director General of Civil Aviation.

2.2 PRODUCTION AIRCRAFT FLIGHTS:

- 2.2.1. The pilots seeking approval of production test pilots should have:
- Current Commercial Pilot Licence [CPL (Aeroplanes)/ CPL(Helicopters)] for test flying aeroplanes/helicopters having maximum certified take-off mass of not exceeding 5700 kgs. as applicable; or
 - Current Airline Transport Pilot Licence [ALTP (Aeroplanes)/ALTP (Helicopters)] for test flying aeroplanes/helicopters having maximum certified take-off mass in excess of 5700 kgs. as applicable;

- c) Production test pilots should have undergone familiarisation with prototype test pilots.

Test Pilots must have the following minimum experience;

- a) For single-engine aircraft:

- | | | | |
|----|--|---|---------|
| 1. | Total flight time as PIC on all types | - | 500 hrs |
| 2. | Flight time as PIC on type/similar aircraft type | - | 100 hrs |
| 3. | Flight time as PIC on type or similar aircraft types during the preceding three months | - | 10 hrs |

- b) For multi-engine aircraft:

- | | | | |
|----|--|---|----------|
| 1. | Total flight time | - | 1000 hrs |
| 2. | Flight time as PIC on multi-engine aircraft | - | 500 hrs |
| 3. | Flight time as PIC on type/similar aircraft type | - | 100 hrs |
| 4. | Flight time as PIC on type or similar aircraft during the preceding three months | - | 10 hrs |

2.2.2. Normally the test flights are carried out in VFR (Visual Flight Rules) conditions. In case the aircraft is to be flight tested for clearance of IFR (Instrument Flight Rules) operations, the production aircraft test pilot should have current IFR rating.

2.2.3. Production test pilots must possess a valid certificate of medical fitness issued by the Director General of Civil Aviation during the period of authorisation.

2.3. IN-SERVICE AIRCRAFT TEST FLIGHTS:

2.3.1 Test pilots for authorisation for test flights of in-service aircraft must meet the requirements given below;

- a) Current CPL (Aeroplanes)/CPL (Helicopter) for test flying aeroplanes/helicopters having maximum certified take-off mass of not exceeding 5700 kgs. as applicable; or
- b) Current ALTP (Aeroplanes)/ALTP (Helicopters) for test flying aeroplanes/helicopters having maximum certified take-off mass in excess of 5700 kgs.

2.3.2 Test pilots must have the following minimum experience;

- a) For single-engine aircraft:

- | | | | |
|----|--|---|---------|
| 1. | Total flight time as PIC on all types | - | 500 hrs |
| 2. | Flight time as PIC on type/similar aircraft type | - | 100 hrs |
| 3. | Flight time as PIC on type or similar aircraft types during the preceding three months | - | 10 hrs |

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- b) For multi-engine aircraft:
- | | | |
|--|---|----------|
| 1. Total flight time | - | 2000 hrs |
| 2. Flight time as PIC on multi-engine aircraft | - | 750 hrs |
| 3. Flight time as PIC on type/similar aircraft type | - | 500 hrs |
| 4. Flight time as PIC on type or similar aircraft
during the preceding three months | - | 10 hrs |
- 2.3.3 Normally the test flights are carried out in VFR (Visual Flight Rules) conditions. In case the aircraft is to be flight tested for clearance of IFR (Instrument Flight Rules) operations, the in-service aircraft test pilot should have current IFR rating.
- 2.3.4 In-service aircraft test pilots must possess a valid certificate of medical fitness issued by the Director General of Civil Aviation during the period of authorisation

3. GENERAL:

- 3.1 In case sufficient number of test pilots are not available for being authorised as prototype/production/in-service aircraft test pilots, the DGCA may, upon request, relax any of the aforesaid requirements, if in the opinion of the DGCA, pilots are otherwise well qualified.

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ADVISORY CIRCULAR NO. 01 OF 2002**Approval of Microlight Aircraft Test Pilots****1.0 INTRODUCTION:**

- 1.1. Flight testing of prototype, production and in-service microlight aircraft needs to be undertaken for assessing the ground handling and flight handling characteristics, aircraft performance and functioning of various systems to determine whether they meet the prescribed standards. The conduct of these flight tests may encounter unforeseen and difficult situations, thus requiring a very high degree of training and piloting skill. In this connection Indian Aircraft Rule 6C empowers the DGCA to authorise the holder of a licence to fly an aircraft not entered in the aircraft rating of the licence, for the purpose of testing or non passenger-carrying flight subject to the terms and conditions of such authorisation, and the authorisation shall be limited in validity to the time needed to complete the flight testing or the specific flight: Provided that the holder of the licence produces evidence to show that he meets the requirements of competency as laid down by Director General for undertaking such flight. This Advisory Circular has been issued in accordance with the requirements of this rule.
- 1.2 This Advisory Circular specifies the requirements to be met by test pilots before they can be considered for authorisation by the DGCA under Sub rule 6C to undertake test flights of:
- a. **Prototype microlight;**
 - b. **Production / In-service microlight ;**

2.0 REQUIREMENTS FOR AUTHORISATION OF MICROLIGHT AIRCRAFT TEST PILOTS:**2.1 PROTOTYPE MICROLIGHT AIRCRAFT TEST FLIGHTS:**

- 2.1.1. Prototype test pilot should have a current Pilot's Licence (Microlight) issued by DGCA.
- 2.1.2. The prototype test pilots must have the engineering / developmental flight test experience for the purpose of establishing the basic airworthiness of microlight or components or parts in the experimental / developmental stage.
- 2.1.3. The test pilots must have the experience including the basic stability, controllability and performance testing to determine compliance with the applicable requirements. The prototype test pilot should involve in the microlight systems, operating limitations, ground handling and flight handling characteristics, normal and emergency procedures and performance of the aircraft, well in advance in the developmental stage.
- 2.1.4. Prototype test pilot should have a minimum of three years flight test experience of working in a reputed flight test organisation. In addition, he should have made three

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take-offs and landings during the last 90 days as a familiarization training in an applicable microlight aircraft.

The experience in production quality control testing of certificated microlight aircraft or flight testing of overhauled microlight aircraft or equipment which have been accepted may be credited towards the flight time experience requirements (maintenance tests).

2.1.5 Test pilots must have the following minimum experience:

- | | | | |
|----|--|---|---------|
| 1. | Total flight time | - | 700 hrs |
| 2. | Flight time as Pilot-in-Command (PIC) on all types | - | 500 hrs |
| 3. | Total flight time as PIC during preceding three months | - | 5 hrs |

2.2 PRODUCTION / IN-SERVICE MICROLIGHT AIRCRAFT TEST FLIGHTS:

2.2.1 The pilots seeking approval of production test pilots should have:

- a) Production/ In-service microlight test pilot should have a current Pilot's Licence (Microlight) issued by DGCA.
- b) Production / In-service test pilots should have undergone familiarisation / briefing with a prototype test pilot / a more experienced production test pilot.

2.2.2 Test Pilots must have the following minimum experience:

- | | | | |
|----|---|---|---------|
| 1. | Total flight time | - | 500 hrs |
| 2. | Flight time as Pilot-in-Command (PIC) on all types- | | 300 hrs |
| 3. | Flight time as PIC on microlight
during the preceding three months | - | 5 hrs |

3.0 GENERAL:

- 3.1 The test flights should be carried out in day VFR (Visual Flight Rules) conditions only.
- 3.2 Pilots should obtain security clearance as per the rules.
- 3.3 Test Flights should be carried out within the specified aerodrome and in coordination with the officer-in-charge of the aerodrome.
- 3.4 Prototype / Production / In-Service test pilots must possess a valid certificate of medical fitness acceptable to Director General of Civil Aviation.

- 3.5 No unauthorized person should be carried on board the aircraft when conducting the test flights.
- 3.6 Necessary insurance cover should be provided by the manufacturer for the test pilot, the aircraft and damages to the third party property.
- 3.7 Manufacturer / Operator is entirely responsible for safely conducting the test flights.

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