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Airworthiness Manual

Approved by the Secretary General
and published under his authority

Third Edition — 2014

International Civil Aviation Organization

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AMENDMENTS

Amendments are announced in the supplements to the *Publications Catalogue*; the Catalogue and its supplements are available on the ICAO website at www.icao.int. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

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FOREWORD

The *Airworthiness Manual* (Doc 9760) was first published in 2001 in two volumes and contained a consolidation of airworthiness-related information previously found in other ICAO documents. As a result, the first edition of the *Airworthiness Manual* replaced the following ICAO documents: the *Airworthiness Technical Manual* (Doc 9051), the *Manual of Procedures for an Airworthiness Organization* (Doc 9389) and the *Continuing Airworthiness Manual* (Doc 9642).

The advance second edition (unedited) of the *Airworthiness Manual* was developed from material previously found in the 2001 edition. The content was reviewed, edited, and expanded on by the Airworthiness Panel during several working group meetings from 2003 to 2007. It incorporated changes to Annex 8 to the Chicago Convention — *Airworthiness of Aircraft*, and to Annex 6 — *Operation of Aircraft*. The content also responded to the request from the ICAO Universal Safety Oversight Audit Programme for additional guidance to States on how to meet their airworthiness responsibilities under the Convention on International Civil Aviation. A new chapter on production activities was also added.

The advance second edition (unedited) was placed on ICAO-NET in 2008 in an electronic format because of the urgency to provide States with the updated guidance. The second edition remained unedited until it was further updated to better assist States in meeting their respective airworthiness responsibilities.

This third edition is presented based on States' roles and responsibilities, thus as State of Registry, State of the Operator, State of Design and State of Manufacture. It also describes the interface between different States and their related responsibilities.

The breadth and depth of the guidance material provided in this edition have been intentionally limited to keep the manual manageable. In order to avoid specific references to material that may become dated, it was decided instead to provide a listing of potential sources of additional, and more detailed, information on the subjects covered in this manual.

Although this manual provides guidance on the suggested content of various State airworthiness regulations, no attempt has been made to formulate specific regulations. A Contracting State should establish and implement a system that enables it to discharge satisfactorily its international obligations and responsibilities. It is recognized, however, that a number of States, particularly those which are still in the early stages of establishing an effective civil aviation organization, do require assistance in developing a framework of appropriate airworthiness regulations.

It is recognized that in some cases it may not be feasible for a State, due to the limited scale of aviation activities or lack of technical and economic resources, to establish and maintain the full airworthiness organization it needs to meet its international obligations. This problem may be particularly acute for some States in respect of their obligation to assess and approve or disapprove the maintenance programme of an air operator utilizing large and complex aircraft. A State finding itself in this position should not in any way diminish the stringency of its regulations; however, it is essential that the State either enter into an agreement with another Contracting State to assist it with the detailed tasks, or obtain the services, on a temporary basis, of qualified inspectors from a State, fully experienced in the matter in question. The ICAO Regional Office accredited to the State may be of assistance to the State in working out cooperative inspection arrangements. It is also recognized that a group of States may elect to discharge their responsibilities through a multinational organization or agency. It is essential that the related agreements clearly define the respective functions of each national authority and the multinational organization or agency, so as to ensure that all obligations of the States are fully discharged.

Procedural information in this manual is generally applicable to all types of aeronautical products unless specifically indicated otherwise. Limited applicability may be ascertained directly from the text or indirectly through the associated applicability of a referenced Annex provision.

Comments on this manual, particularly with regard to its application and usefulness, would be appreciated from all States, safety oversight audit missions and ICAO technical cooperation field missions. These will be taken into consideration in the preparation of subsequent editions. Comments should be addressed to:

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ICAO websites related to airworthiness**Flight Safety Information:** www.icao.int/fsix

This site is intended as a portal to existing safety-related websites as well as a place to exchange information through various newsgroups. This site contains the following areas:

Resolving Safety Deficiencies – Material to help States resolve safety deficiencies grouped by topic based on the results of ICAO audit reports. It also contains information on how to set up a Regional Safety Oversight Organization, which is one path for a set of States to pool resources to solve safety deficiencies.

Safety Oversight Information – Contains links to audit reports as well as to the ICAO Universal Safety Oversight Audit Programme page which is restricted to Contracting States. It also contains links to information on aircraft accidents and incidents as well as aircraft registration.

Regulations – Provides links to the civil aviation regulations of Contracting States.

Safety Management – Refers to the ICAO Safety Management initiative website.

Safety-Related Links – Contains links to other ICAO and industry safety initiatives.

Website links for civil aviation authorities and International Organizations:

<http://www.icao.int/Pages/links.aspx>

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PART I

DEFINITIONS AND ABBREVIATIONS

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GLOSSARY

DEFINITIONS

When the following terms are used in this manual, they have the meanings shown. Specific definitions found in Annexes 6, 7, 8 and 16 are reproduced to facilitate their use in this manual. The additional definitions are appropriate to use in this document only.

Aeronautical product. Any aircraft, aircraft engine, aircraft propeller or a part to be installed thereon.

Aeroplane. A power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight.

Aeroplane system. An aeroplane system includes all elements of equipment necessary for the control and performance of a particular major function. It includes both the equipment specifically provided for the function in question and other basic related aeroplane equipment such as that required to supply power for the equipment operation. The engine is not considered to be an aeroplane system.

Air operator certificate (AOC). A certificate authorizing an operator to carry out specified commercial air transport operations.

Aircraft. Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

Aircraft operating manual. A manual, acceptable to the State of the Operator, containing normal, abnormal and emergency procedures, checklists, limitations, performance information, details of the aircraft systems and other material relevant to the operation of the aircraft.

Note.— The aircraft operating manual is part of the operations manual.

Airworthiness Directive (AD). A regulatory document which identifies aeronautical products in which an unsafe condition exists, and where the condition is likely to exist or develop in other aeronautical products of the same type design. It prescribes mandatory corrective actions to be taken or the conditions or limitations under which the aeronautical products may continue to be operated. The AD is the common form of mandatory continuing airworthiness information mentioned in Annex 8.

Airworthiness Standards. Detailed and comprehensive design and safety criteria applicable to the category of the aeronautical product (aircraft, engine and propeller) that satisfy, at a minimum, the applicable standards of Annex 8.

Airworthy. The status of an aircraft, engine, propeller or part when it conforms to its approved design and is in a condition for safe operation.

Appropriate airworthiness requirements. The comprehensive and detailed airworthiness codes established, adopted or accepted by a Contracting State for the class of aircraft, engine or propeller under consideration.

Certificate holder. An individual or organization that meets the established requirements and functions at the level of competency and safety required by the State to undertake an aviation-related activity for which it has been licensed, certified, authorized and/or approved to perform.

Certification basis. The applicable airworthiness and environmental standards established by a State as the basis by which the type design of an aeronautical product, or change to that type design, is approved or accepted. The certification basis may also include special conditions of airworthiness, findings of equivalent level of safety, and/or exemptions when determined by the State to apply to the type design.

Certification maintenance requirement. Scheduled maintenance that is required by design to help show compliance with the appropriate type certification basis by detecting the presence of a safety-significant latent failure that would result in a hazardous or catastrophic failure condition.

Configuration deviation list (CDL). A list established by the organization responsible for the type design with the approval of the State of Design which identifies any external parts of an aircraft type which may be missing at the commencement of a flight, and which contains, where necessary, any information on associated operating limitations and performance correction.

Continuing airworthiness. The set of processes by which an aircraft, engine, propeller or part complies with the applicable airworthiness requirements and remains in a condition for safe operation throughout its operating life.

Environmental Standards. The specifications defined in Annex 16 — *Environmental Protection* for the certification of aircraft noise and engine smoke and gaseous emissions, including the standards for the prevention of intentional fuel venting into the atmosphere.

Equivalent level of safety. As used in type certification, a finding where literal compliance with a specific airworthiness requirement cannot be demonstrated but compensating factors exist in the type design that can be shown to provide a level of safety equivalent to that intended by the certification basis.

Exception/Exemption. A relief from compliance with the requirement(s) of airworthiness or environmental standards, or operating rules, based on the determination by a civil aviation authority that granting such relief will not adversely affect safety.

Extended diversion time operation (EDTO). Any operation by an aeroplane with two or more turbine engines where the diversion time to an en-route alternate aerodrome is greater than the threshold time established by the State of the Operator.

EDTO — configuration, maintenance and procedures (CMP) requirements. The particular aeroplane configuration minimum requirements including any special inspection, hardware life limits, master minimum equipment list (MMEL) constraints and maintenance practices found necessary to establish the suitability of an airframe-engine combination for extended diversion time operation.

EDTO — significant system. An aeroplane system whose failure or degradation could adversely affect the safety particular to an EDTO flight, or whose continued functioning is specifically important to the safe flight and landing of an aeroplane during an EDTO diversion.

Failure condition. The effect on the aircraft and its occupants, both direct and consequential, caused or contributed to by one or more failures, considering relevant adverse operational or environmental conditions.

Instructions for continuing airworthiness (ICA). A set of descriptive data, maintenance planning and accomplishment instructions, developed by a design approval holder in accordance with the certification basis for the aeronautical product. The ICAs provide air operators with the necessary information to develop their own maintenance programme and also for approved maintenance organizations to establish the accomplishment instructions.

Latent failure. A failure that is not detected and/or enunciated when it occurs.

Life-limited part. Any part for which a mandatory replacement limit (in hours, cycles or calendar time) is specified in the type design, the mandatory continuing airworthiness information or instructions for continuing airworthiness. These parts must be permanently removed from service on or before this limit is reached.

Maintenance. The performance of tasks required to ensure the continuing airworthiness of an aircraft, including any one or combination of overhaul, inspection, replacement, defect rectification, and the embodiment of a modification or a repair.

Maintenance organization's procedures manual. A document which details the maintenance organization's structure and management responsibilities, scope of work, description of facilities, maintenance procedures, and quality assurance, or inspection systems. This document is normally endorsed by the head of the maintenance organization.

Maintenance programme. A document which describes the specific scheduled maintenance tasks and their frequency of completion and related procedures, such as a reliability programme, necessary for the safe operation of those aircraft to which it applies.

Maintenance release. A document which contains a certification confirming that the maintenance work to which it relates has been completed in a satisfactory manner, either in accordance with the approved data and the procedures described in the maintenance organization's procedures manual or under an equivalent system.

Major modification. In respect of an aeronautical product for which a type certificate has been issued, a change in the type design that has an appreciable effect, or other than a negligible effect, on the mass and balance limits, structural strength, engine operation, flight characteristics, reliability, operational characteristics, or other characteristics or qualities affecting the airworthiness or environmental characteristics of an aeronautical product.

Major repair. Any repair of an aeronautical product that might appreciably affect the structural strength, performance, engine, operation flight characteristics or other qualities affecting airworthiness or environmental characteristics.

Mandatory Continuing Airworthiness Information (MCAI). The mandatory requirements for the modification, replacement of parts, or inspection of aircraft and amendment of operating limitations and procedures for the safe operation of the aircraft. Among such information is that issued by Contracting States in the form of airworthiness directives.

Master minimum equipment list (MMEL). A list established for a particular aircraft type by the organization responsible for the type design with the approval of the State of Design containing items, one or more of which is permitted to be unserviceable at the commencement of a flight. The MMEL may be associated with special operating conditions, limitations or procedures.

Minimum equipment list (MEL). A list which provides for the operation of aircraft, subject to specified conditions, with particular equipment inoperative, prepared by an operator in conformity with, or more restrictive than, the MMEL established for the aircraft type.

Minor modification. A modification other than a major modification.

Minor repair. A repair other than a major repair.

Modification. A change to the type design of an aeronautical product which is not a repair.

Operations manual. A manual containing procedures, instructions and guidance for use by operational personnel in the execution of their duties.

Operator's maintenance control manual. A document which describes the operator's procedures necessary to ensure that all scheduled and unscheduled maintenance is performed on the operator's aircraft on time and in a controlled and satisfactory manner.

Organization responsible for the type design. The organization which is the holder of the type certificate and has the responsibility of the design of the aeronautical product and the continuous compliance of the aeronautical product type design to the appropriate airworthiness requirements imposed by the type certifying authority. In some cases (prior to Amendment 98 of Annex 8), it will be the holder of an equivalent document certifying approval of the type design by the certifying authority.

Propulsion system. A system consisting of an engine and all other equipment utilized to provide those functions necessary to sustain, monitor and control the power/thrust output of any one engine following installation on the airframe.

Repair. The restoration of an aeronautical product to an airworthy condition as defined by the appropriate airworthiness requirements.

Safety management system. A systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures.

State of Design. The State having jurisdiction over the organization responsible for the type design.

State of Manufacture. The State having jurisdiction over the organization responsible for the final assembly of the aircraft.

State of Registry. The State on whose register the aircraft is entered.

State of the Operator. The State in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.

Structural inspection. A detailed inspection of the airframe structure that may require special inspection techniques to determine the continuous integrity of the airframe and its related parts.

Threshold time. The range, expressed in time, established by the State of the Operator to an en-route alternate aerodrome, whereby any time beyond requires an EDTO approval from the State of the Operator.

Type certificate. A document issued by a Contracting State to define the design of an aircraft type and to certify that this design meets the appropriate airworthiness requirements of that State.

Note.— Some Contracting States also issue Type Certificates for engines and propellers.

Type design. The set of data and information necessary to define an aeronautical product type for the purpose of airworthiness determination to any later aeronautical product of the same type.

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ABBREVIATIONS

When the following abbreviations and acronyms are used in this manual, they have the meanings shown.

AD	Airworthiness directive
AED	Airworthiness engineering division
AFM	Aircraft flight manual
AID	Airworthiness inspection division
ALI	Airworthiness limitation items
AMO	Approved maintenance organization
AOC	Air operator certificate
APU	Auxiliary power unit
CAA	Civil aviation authority
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CDL	Configuration deviation list
CG	Centre of gravity
CMR	Certification maintenance requirements
DGCA	Director General of Civil Aviation
EDTO	Extended diversion time operations
ETOPS	Extended range operations by aeroplanes with two turbine engines
ICA	Instructions for continuing airworthiness
JAR	Joint Aviation Requirements
Kg	Kilogram
LoV	Limit of validity
MCAI	Mandatory continuing airworthiness information
MCM	Maintenance control manual
MEL	Minimum equipment list
MMEL	Master minimum equipment list
MOPM	Maintenance organization's procedures manual
MRB	Maintenance review board
MSG	Maintenance steering group
MTOM	Maximum certificated take-off mass
OEM	Original equipment manufacturer
RVSM	Reduced vertical separation minima
SB	Service bulletin
SDR	Service difficulty report
SIP	Structural integrity programme
STC	Supplemental type certificate
TBO	Time between overhauls
TC	Type Certificate
TCB	Type certification board
TSN	Time since new
TSO	Time since overhaul

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Chapter 1

STATE AIRWORTHINESS RESPONSIBILITIES

1.1 OBLIGATIONS UNDER THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

1.1.1 The Convention on International Civil Aviation was signed at Chicago on 7 December 1944. The preamble states in part, “Whereas the future development of international civil aviation can greatly help to create and preserve friendship and understanding among the nations and peoples of the world. Therefore undersigned governments have agreed on certain principles and arrangements in order that international civil aviation is developed in a safe and orderly manner”.

1.1.2 With respect to airworthiness, Article 29 of the Convention provides that every aircraft of a Contracting State, engaged in international navigation, carries a Certificate of Registration and a Certificate of Airworthiness. Article 31 of the Convention provides that the Certificate of Airworthiness is issued or rendered valid by the State in which the aircraft is registered. Furthermore, Article 33 of the Convention requires that Contracting States recognize as valid the Certificate of Airworthiness issued or rendered valid by the State of Registry provided that the requirements under which the certificate was issued or rendered valid are equal to or above the minimum standards established by ICAO. Article 54 of the Convention allows ICAO to issue Standards and Recommended Practices (SARPs) and to designate them as Annexes to the Convention. The Annexes largely covering the airworthiness of aircraft are:

Annex 6 — Operations of Aircraft

Annex 8 — Airworthiness of Aircraft.

Note.— Annex 1 — Personnel Licensing, Annex 7 — Aircraft Nationality and Registration Marks and Annex 16 — Environmental Protection, also provide the requirements for the licensing of maintenance personnel, registration of aircraft and noise certification, respectively.

1.1.3 Annex 8 outlines a framework of airworthiness standards for the design and manufacture of large aeroplanes, helicopters, small aeroplanes, engines and propellers. Annex 6 outlines minimum requirements for the operation and maintenance of aircraft. Annex 6 is issued in three Parts: Part I — *International Commercial Transport — Aeroplanes*, Part II — *International General Aviation — Aeroplanes*, and Part III — *International Operations — Helicopters*.

1.1.4 Article 12 of the Convention points out that each Contracting State undertakes to keep its own regulations in these respects uniform, to the greatest extent possible, with those established from time to time under this Convention. Through national regulations, States are expected to implement and enforce the Standards contained in the Annexes to the Convention.

1.1.5 Article 37 of the Convention requires each Contracting State to collaborate in securing the highest practical degree of uniformity in regulations, standards, procedures and organization in relation to aircraft. Contracting States have the responsibility for the safe operation and performance of maintenance in accordance with the SARPs. Each State should develop its own airworthiness standards based on the framework provided in Annex 8, or adopt those already developed by another State.

1.1.6 Article 38 of the Convention provides when the State finds it impracticable to comply with any international standard or procedure, or to bring its regulations or practices in accord with any international standard or procedure after amendment, that it notify ICAO of differences between its own practice and that established by the ICAO Standards. ICAO publishes these differences, and each Contracting State can decide if an aircraft from a State that filed a difference can be allowed to operate over its territory.

1.1.7 In the development of national airworthiness regulations and rules, the State of Registry is responsible to make certain that every aircraft on its register conforms to the approved type design in accordance with the airworthiness code it has adopted or accepted for that class of aircraft. The State of Registry also has the responsibility to make certain that every aircraft on its register is maintained in an airworthy condition throughout its operational service life. Therefore, effective continuing airworthiness requirements are most important. Although methods of discharging the foregoing State airworthiness responsibilities may vary, and in some cases may involve the transfer of certain tasks to authorized organizations or other States, such arrangements do not relieve the State of Registry from its overall responsibility (see Annex 8, Part II, 4.2.3).

1.1.8 The State of Registry is responsible for the maintenance performed by an approved maintenance organization (AMO) or under an acceptable equivalent system. A review of the aircraft register and of the authorizations granted to an AMO or under an acceptable equivalent system will assist the State in determining if the operations are within its safety oversight capability. Where this is not the case, the State is urged to take immediate and appropriate actions to enhance the State oversight system.

1.1.9 In those States where the State is both the regulatory authority and an air operator, the requirements of the Convention on International Civil Aviation should be met and public interest should be best served by the separation of authority and responsibility between the State regulatory authority and the State operating agency. The necessary certification procedures should be followed as though the air operator was a non-government entity.

1.1.10 A State regulatory system and safety oversight organization are described in the subsequent chapters of this manual.

1.1.11 A State may find that it does not have the resources to establish a system for the effective certification and oversight of its air operators and/or approval holders. Experience has been gained with the formation of regional safety oversight organizations (RSOO) where economies of scale can be achieved through the sharing and pooling of human and financial resources. The Cooperative Development of Operational Safety and Continuing Airworthiness Projects (COSCAP) were designed to achieve the necessary level of regional cooperation in this context. Guidance is provided in the *Safety Oversight Manual*, Part B — *The Establishment and Management of a Regional Safety Oversight System* (Doc 9734).

1.1.12 As an alternative, for a State in need of assistance and where regional cooperation is not viable, the Director General of Civil Aviation may consider the employment of a competent and independent commercial organization to supply the necessary qualified personnel to perform the required inspection functions in an advisory capacity to the Civil Aviation Authority (CAA). The State retains responsibility under the Chicago Convention and as such is responsible to ensure the delegated tasks are performed in accordance with international and national requirements.

1.2 DISCHARGE OF STATE RESPONSIBILITIES

1.2.1 In order to discharge its overall responsibilities under the Convention, the State needs to enact primary aviation legislation providing the legal basis for the development and promulgation of civil air regulations and practices, including airworthiness regulations, consistent with the Annexes. The State regulatory system should:

- a) represent a well-balanced allocation of responsibility between the State and those persons or organizations conducting airworthiness-related activities (e.g., provisions for surveillance and enforcement of the regulations);
- b) be capable of economic justification within the resources of the State;
- c) enable the State to maintain continuing regulation and supervision of the airworthiness activities of the air operator, design organization, manufacturer and maintenance facility without unduly inhibiting their effective direction and control of their organizations; and
- d) result in the cultivation and maintenance of harmonious relationships between the State and those persons or organizations applying airworthiness regulations in practice.

1.2.2 The airworthiness regulatory system to be established will vary depending upon the level of complexity and scope of aviation activity within the State. The airworthiness regulatory system should include:

- a) drafting and amendment of rules relating to the airworthiness of aircraft;
- b) issuance, acceptance or validation of type certificate of aircraft, engine and propeller;
- c) approval and continued inspection of approved design and production organization of aircraft and parts;
- d) registration of aircraft;
- e) certification and approval of initial applications of air operators (airworthiness aspects);
- f) continued inspection and surveillance of certificated air operators (airworthiness aspects);
- g) issuance, acceptance or validation of noise certificate;
- h) issuance, renewal and continuing validation of the Certificate of Airworthiness;
- i) approval of maintenance programme;
- j) approval of modifications and mandatory inspection;
- k) approval of repairs;
- l) approval and continuing inspection of AMOs;
- m) monitoring and control of mandatory continuing airworthiness information (MCAI);
- n) approval and continued inspection of approved maintenance training organizations; and
- o) licensing of aviation personnel.

1.2.3 Through the proper process of registering aircraft and the issuance of the certificates and approvals, the State ensures public safety and interest are addressed. Furthermore, the State will be able to exercise appropriate influence and control of airworthiness activities without encroaching upon its air operators, design organizations, manufacturers and maintenance organizations' responsibilities for safety.

1.3 AIRWORTHINESS RESPONSIBILITIES IN ANNEX 6 AND ANNEX 8

1.3.1 Additional equipment

Annex 6 includes additional aircraft equipment requirements that must be incorporated into aircraft for particular types of operation. The aircraft should satisfy the airworthiness requirements of Annex 8, but may not be usable for a specific operational task without meeting the additional requirements of Annex 6. Therefore, any specific operational equipment required by Annex 6 should meet the current airworthiness requirements of Annex 8, unless otherwise specified. However, should operational equipment be required by an amendment to Annex 8, the applicable date will be three years after the date of the adoption of the amendments in accordance with Article 41 of the Convention.

1.3.2 Aircraft maintenance

Annex 6 includes provisions for continuing airworthiness of aircraft, including air operators' maintenance responsibilities, the maintenance control manual (MCM), maintenance programme requirements, maintenance record-keeping, modification and repair data approval requirements, AMO and maintenance release requirements. These requirements are intended to ensure that an aircraft remains in a safe condition throughout the operational life of the aircraft and continues to conform to the approved design data.

1.4 CONTINUING AIRWORTHINESS RESPONSIBILITIES IN ANNEX 6 AND ANNEX 8

1.4.1 Annex 6 includes a requirement for the air operator to monitor and assess maintenance and operational experience with respect to continuing airworthiness, provide this information as prescribed by the State of Registry and report through a system as specified Annex 8, Part II, Chapter 4. The air operator should also obtain and assess continuing airworthiness information and recommendations available from the organization responsible for the type design and should implement any necessary actions in accordance with a procedure acceptable to the State of Registry.

1.4.2 Annex 8, Part II, 4.2 includes requirements for the continuing airworthiness of aircraft. Along with relevant airworthiness responsibilities of the State of Design, State of Manufacture, State of Registry, and all Contracting States, the chapter also includes requirements for States to transmit information.

1.4.3 Annex 8, Part II, 4.2.1 provides that the State of Design transmits information which it has found necessary for the continuing airworthiness of aircraft and provides notification of the suspension or revocation of a type certificate.

1.4.4 Annex 8, Part II, 4.2.3 requires the State of Registry, when it first enters an aircraft on its register, to advise the State of Design of such action. This is done to ensure the State of Design will transmit MCAI to the State of Registry.

1.4.5 The State of Registry, upon receipt of MCAI from the State of Design, either adopts the information or will assess the information and take appropriate action.

1.4.6 The State of Registry should ensure that all MCAI originated by it in respect of the aircraft on its register is transmitted to the State of Design.

1.4.7 The State of Registry should ensure that there is a system where information on faults, malfunctions, defects and other occurrences that may have adverse effects on the continuing airworthiness of the aircraft be transmitted to the organization responsible for type design.

1.4.8 Each Contracting State should require its air operators, organizations responsible for type design and maintenance organizations to report to its airworthiness authority such information.

Chapter 2

PRIMARY AVIATION LEGISLATION

2.1 INTRODUCTION

2.1.1 Article 12 of the Convention stipulates that a Contracting State is obligated to adopt measures to ensure safety through conformity with international standards in its safety oversight obligations. The elements of a State oversight system include promulgating legislation and regulations and empowering the CAA.

2.1.2 It is important that a State promulgates primary aviation legislation, such as a national civil aviation code or a civil aviation act that establishes a State's civil aviation organization. The Convention in most of its Articles refers to national laws and regulations relating to departure from its territory of civil aircraft engaged in international air commerce. The Convention also refers to State regulations in respect to operation, airworthiness and registration of such aircraft within its territory. Additionally, Article 12 of the Convention requires each Contracting State to keep its own regulations uniform to the greatest extent possible with those established under the Convention. Article 12 of the Convention not only requires uniformity of such regulations with the Convention but obligates States to ensure the prosecution of all persons violating relevant regulations.

2.2 STRUCTURE AND CONTENT

2.2.1 Primary aviation legislation should contain provisions to establish a civil aviation administration that proactively supervises and regulates civil aviation activities. The legislation should contain provisions for the approval and safety oversight of air operators, aircraft maintenance organizations, and maintenance training organizations for the safe operation of aircraft. It should also establish requirements for the qualification and licensing of maintenance personnel. The legislation should also reference appropriate support functions with the establishment of an airworthiness inspection division (AID) and airworthiness engineering division (AED). The AID and AED duties should include the registering of aircraft, airworthiness certification of air operators, issuance and renewal of the Certificate of Airworthiness, issuance of documents attesting noise certification, approval of maintenance organization, approval of maintenance programme, the evaluation and issuance of modification and repair approvals, and the evaluation and issuance of design approvals and approval of manufacturing organizations. In addition to the certification duties it will be necessary for the legislation to stipulate the need for the State to perform surveillance of its aviation industry adequate to ensure that at least annual audits are conducted of its certified air operators, AMOs, training organizations, and design and production organizations. The surveillance programme should sufficiently cover the complexity of the State's aviation industry. The legislation should also contain provisions for the issuance and compliance of mandatory continuing airworthiness information (MCAI), as necessary.

2.2.2 Primary aviation legislation is essential to an effective safety oversight programme. The extent of the CAA's authority and empowerment and that of its Director General of Civil Aviation (DGCA) must be reflected in the legislation thereby giving the CAA a solid foundation in a legal document. The legislation should also provide for the independent airworthiness investigation of aircraft accidents and incidents to ensure impartial and objective investigations to correct shortcomings not only within the aviation industry but also within the CAA.

2.2.3 With the enactment of primary aviation legislation the State can develop and promulgate civil aviation regulations and practices, including airworthiness regulations consistent with the Annexes. In the development of these regulations, the State is responsible to ensure that the regulations are consistent with and relevant to the Convention, Annexes and its aviation industry. Further, the State will need to ensure a process exists for the amendment of its regulations and the notification to ICAO of differences, when necessary.

2.2.4 With the enactment of a comprehensive civil aviation law that allows provisions to establish a civil aviation administration, with competent personnel and ample airworthiness regulations and requirements, the State is encouraged to enact a system of interactive participation in airworthiness matters through the establishment of an AID and, when necessary, an AED. The divisions should enable the State to maintain the well-balanced, continuing certification, surveillance, supervision and certificate management of the air operator, maintenance facilities, maintenance training, maintenance personnel and, when necessary, design and manufacturing organizations without inhibiting the efficiency of the authority's ability to perform its certification and oversight functions. Accident and incident prevention provisions should be referenced in the legislation to enable the CAA to focus towards continuous improvement in regard to the performance of maintenance and other airworthiness matters within the State.

2.2.5 The promulgation of civil airworthiness regulations and procedures is necessary for the CAA to effectively discharge its official airworthiness responsibilities and to carry out those duties associated with the design, manufacture, operation, maintenance of aircraft and aeronautical products and the certification of maintenance personnel consistent with the Chicago Convention and its Annexes.

Note.— Guidance on the establishment of a State's Safety Oversight System is available in the Safety Oversight Manual (Doc 9734), Part A — The Establishment and Management of a State's Safety Oversight System.

Chapter 3

STATE REGULATORY SYSTEM

3.1 GENERAL

3.1.1 The State's law and regulations should conform to the Chicago Convention and its Annexes. The regulations may be viewed as minimum requirements that may be exceeded by the certificate holder. Contracting States are responsible for developing regulations with sufficient detail that, at a minimum, support the complexity of the aviation industry within their State and achieve a satisfactory level of safety. The development of regulations should include an amendment process that includes publishing the amendment for comment within the State. The comment review process should consist of a review, consideration, disposition, and appropriate revision of any proposed amendment. The review should take into consideration the benefit to aviation safety, the public's ability to comply with the amendment and any potential undue burden the amendment may pose on the industry.

3.1.2 Annexes are published to supplement the Convention, as referenced in Article 54. Annexes specify SARPs that a Contracting State can reference in order to ensure the highest practicable degree of uniformity in its national regulations. Regulations developed by States should be supported by law. The law should address the types of regulations necessary to facilitate a capable authority oversight system and licensing system. The regulations should also address the requirements needed for the applicability, qualification, certification, design, manufacturers, maintenance organizations, training organizations, air operators, and aircraft engaged in international air transportation to be consistent with the Annexes. In some instances States may have a need to develop regulations that go beyond the minimum standards. In this case, States should expect the certificate holder, e.g. air operator or AMO, to take responsibility in providing a specific expectation, for example, approval of major modification and repair designs by the CAA, prior to returning the aircraft to service.

3.1.3 A State's regulations should be worded in legal terms and written so they can be used by the authority in licensing, certificating and approvals during the day-to-day functions of the State safety oversight system. The regulations should be performance based and form a framework of a minimum standard unless the provision calls for a higher standard.

3.1.4 The State has an option of adopting other Contracting States' regulations. Adopting another State's regulations has some advantages but should be considered only after ensuring the other State's regulations are consistent with the ICAO Standards. The complexity of the other State's aviation environment should also be considered. A State with a limited aviation environment should be careful not to place an undue burden on its aviation community by adopting complex regulations. A State may consider adapting its regulations to meet the needs of its aviation environment while still maintaining consistency with other States. A State adopting regulations from another Contracting State would be expected to maintain a currency with the amendments of the adopted regulations and report differences to ICAO in accordance with Article 38 of the Convention.

3.1.5 Article 38 of the Convention specifies if the State finds it impracticable to comply in all respects with any international standards or to bring its own regulations in full accord with international standards as amended, or if it deems it necessary to adopt regulations or practices differing from ICAO Standards, the State immediately notifies ICAO of the differences between its own practice and that established by the international standards. ICAO is obliged to immediately notify all other States of the difference which exists between one or more aspects of the Standard and the corresponding national practice of the notifying State. Several Articles of the Convention make it clear that if standards adopted by a State are lower than those required by ICAO, aircraft, certificate holders, or persons with licenses or

certificates may not be able to participate in international air navigation, except with the permission of the State or States whose territory is entered. A State may request blanket permission on behalf of its certificate holders or licence holders.

3.1.6 Compliance with the regulations is not optional. Occasionally, there might be an instance where there is a geographical, physical or operational environmental problem that places an undue burden upon the certificate holder in complying with the relevant regulation. With well documented regulations in place a State may grant an exception or exemption to a regulation provided there exists a mechanism within the State's criteria to establish that exception or exemption. The relief granted should be considered the exception and not the norm. The person requesting relief should prove that the current requirement places an undue burden upon the certificate holder. A risk assessment should also be conducted to ensure that the exemption sought will not cause an adverse impact towards safety. The request for exemption should also contain an equivalent level of safety commensurate with the regulation and will be practiced should the exemption be granted by the State. If an exemption is granted it should be accompanied by conditions and limitations, including a time limitation to the exemption. The authority granting the exemptions should monitor such exemptions to ensure that continuation of the relief is warranted.

3.2 AIRWORTHINESS REGULATIONS

The airworthiness regulations developed, adopted or accepted by the State should include provisions for:

- a) mandatory registration of all aircraft;
- b) implementation of the airworthiness provisions meeting the requirements of the Convention and the Annexes;
- c) all aircraft on the State's aircraft register to meet relevant airworthiness criteria approved or adopted by the State;
- d) the issuance, validation or acceptance of the type certificate for aircraft intended to be entered on the State's aircraft register;
- e) the issuance of production certificates or approvals of manufacturing organizations when applicable;
- f) the issuance, renewal, validation or acceptance of aircraft certificates of airworthiness;
- g) the issuance of export certificates of airworthiness;
- h) the issuance or acceptance of ADs, bulletins and orders;
- i) the issuance, amendment, cancellation and suspension of airworthiness approvals, licences and certificates;
- j) the authorization of persons or organizations, on behalf of the CAA, to perform particular tasks in relation to the design, manufacture and maintenance of aircraft, components and parts for the issuance of State approvals, licences and certificates, as appropriate;
- k) the authorization of persons and organizations, on behalf of the CAA, to inspect and test aircraft, aircraft components, standard parts, materials or processes and systems for the purpose of ascertaining whether the processes and activities covered by an approval, licence or certificate have been carried out in a satisfactory manner, as appropriate; and

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- l) the imposition of penalties for a contravention of, or failure to comply with, a provision of the State's civil aviation laws, regulations or directives, or conditions issued, given, made or imposed under, or in force by virtue of, the State laws, regulations or directives.
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Chapter 4

AIRWORTHINESS ORGANIZATION

4.1 STRUCTURE OF THE CAA

4.1.1 Pursuant to delegated authority, the Director General of Civil Aviation (DGCA) should establish an effective organization and employ the necessary qualified personnel to carry out its responsible functions. The structure and size of the CAA's airworthiness organization will vary considerably depending on the number, size and complexity of civil air operations (commercial and private) in the State and on the size and scope of the State's aviation manufacturing and maintenance industry.

4.1.2 In deciding upon the required airworthiness organizational structure, the DGCA should review the requirements for certification and surveillance of air operators as outlined in this Airworthiness Manual and also in the *Manual of Procedures for Operations Inspection, Certification and Continued Surveillance* (Doc 8335), in light of the number and size of potential air operators in the State. The DGCA should consider the level of civil aviation activity and the size of the State's aviation manufacturing and maintenance industry when establishing the organizational structure. In those States where there are extensive aviation operations, manufacturing and maintenance, it will generally be necessary to establish within the CAA airworthiness organization an airworthiness engineering division (AED) and an airworthiness inspection division (AID). The establishment and functioning of these two divisions are discussed in this manual. To be effective, the CAA should provide an adequate level of administrative support, including comprehensive information technologies, facilities, and means of transportation for members of the organization.

4.1.3 It is also recognized that a State or group of States may elect to discharge their responsibilities through agreements with a regional safety oversight organization or agency. It is essential that the agreements clearly define the respective functions each party is to perform, so as to ensure that all obligations of the States are fully discharged. Responsibility for proper execution of ICAO SARPs remains with the Contracting State.

Note.—The Safety Oversight Manual (Doc 9734) — Part B (The Establishment and Management of a Regional Safety Oversight System) provides guidance on such agreements.

4.1.4 In those States which do not have an aviation manufacturing industry, the airworthiness organization within the CAA will be mainly concerned with inspection, authorization and approval functions. Furthermore, in some States which do not have an aviation manufacturing industry and the size and number of commercial and general aviation operations is relatively small, the responsibilities of the DGCA may be fulfilled in a more cost-effective manner through cooperative inspection arrangements with neighbouring States or regional inspection organizations. Where the frequency of certain airworthiness inspection or examination activities is low, such as the activity associated with the validation of type certificates and issue of certificates of airworthiness, it may be advantageous to enter into an arrangement for another State or an approved organization or person to perform work on behalf of the State of Registry. The State of Registry remains responsible under the Convention for the work performed.

Note.— The ICAO Regional Office accredited to the State may be of assistance to the DGCA in working out cooperative inspection arrangements.

4.1.5 The DGCA must ensure that the CAA retains effective control of important inspection functions. Such functions should not be delegated in such a manner that commercial air operators, aircraft manufacturers, maintenance facilities and general aviation aircraft owners, in effect, regulate themselves in airworthiness matters. Regardless of the

organizational arrangements established, the DGCA must bear in mind that the obligations of each State to comply with the provisions of Annexes 6 and 8 remain unchanged.

4.1.6 The Convention requires that a number of approvals be issued by the State, but the CAA may wish to authorize an organization or a delegated person to make approvals on behalf of the CAA. A system of delegations implemented by the CAA will generally satisfy this requirement, providing it incorporates the following features:

- a) the national law and/or regulation permit the CAA to designate its functions;
- b) the standards to be achieved are clearly documented by the CAA. A designee can apply only a documented standard approved by the CAA;
- c) the designees are required to meet technical and regulatory competency requirements and are authorized to make approvals only in areas of their demonstrated competence;
- d) the CAA has an interest in the continuing proficiency of the designees and monitors their continued training so that they remain competent in the fields of their authorization;
- e) the designees' procedures have been approved by the CAA, and the CAA audits the designees to ensure they follow those procedures. The procedures should clearly identify where an approval is made, and will normally include a clear differentiation between the development of data and the approval of that data;
- f) the basis for making the approval is clearly documented; and
- g) the designees make approvals for and on behalf of the CAA.

An approval made by a correctly authorized designee will be accepted as if it was made by the CAA. However, responsibility for the issuance of the approval remains with the State.

Note.— The Safety Oversight Manual (Doc 9734) — Part B (The Establishment and Management of a Regional Safety Oversight System) provides guidance on such arrangements.

4.2 GENERAL FUNCTIONS AND RESPONSIBILITIES

The major function of the airworthiness organization is to provide technical advice to the DGCA on all matters affecting it including:

- a) design and manufacturing approvals and continuing airworthiness of the design, when applicable;
- b) granting or validation of aircraft noise certification and issuance of attestation of noise certification;
- c) continuing airworthiness of aircraft and parts thereof;
- d) issuance of approvals based on the successful assessment of maintenance organizations, air operators, aircraft maintenance training organizations, and aircraft maintenance technician/engineer/mechanic;
- e) approval of modifications and repairs;

- f) issuance of approvals (Certificate of Airworthiness, Certificate of Airworthiness for Export and special flight permits), based on the successful assessment of aircraft, engines, propellers, and equipment produced in the State or of foreign-manufactured aircraft intended to be placed on the State aircraft register;
- g) the manufacture of aeronautical products in the State, when applicable;
- h) registration of aircraft;
- i) issuance and renewal of certificates of airworthiness;
- j) taking of appropriate action with MCAI;
- k) continuing airworthiness oversight, enforcement actions;
- l) training and licensing; and
- m) distribution of airworthiness information to the public.

The specific responsibilities assigned within the airworthiness organization will vary somewhat depending upon the scope of the aviation industry in the State, but should normally include those tasks defined in this chapter.

4.3 REGULATIONS, POLICIES AND GUIDANCE

The airworthiness organization should:

- a) develop national airworthiness regulations, standards, policy and guidance;
- b) amend, as appropriate, national airworthiness regulations, policy and guidance, based on a continual review of the viability and effectiveness of those regulations, policy and guidance;
- c) examine changes in ICAO requirements for incorporation into national requirements, or the filing of appropriate differences;
- d) examine current and, as necessary, new foreign regulations and determine the need for adoption of critical features of the foreign regulations in the national requirements;
- e) establish working relationships with other CAAs and industry that facilitate the certification of foreign aeronautical products to enable their import and export;
- f) conduct research and development, as necessary, to support issuance of regulations, standards, policy and guidance; and
- g) identify and resolve regulatory problems associated with continuing airworthiness and establish appropriate general and technical regulations, policies and procedures.

4.4 SURVEILLANCE, INVESTIGATIONS AND ENFORCEMENT

The airworthiness organization should:

- a) develop and implement periodic surveillance programmes based on the airworthiness complexity of the aviation industry. These programmes should include, but not be limited to, design organizations, manufacturers, air operators, maintenance organizations, maintenance training organizations and delegated tasks;
- b) establish a programme for the surveillance of operations by foreign air operators;

Note.— The Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (Doc 8335) provides guidance on the surveillance of operations by foreign air operators.

- c) perform periodic and unannounced surveillance of industry activities to ensure compliance with national requirements and ICAO Standards. This includes:
 - i) ensuring the proper functioning of any designees or designation systems;
 - ii) evaluating changes to a certificate or approval to ensure continued compliance with the applicable airworthiness requirements;
 - iii) coordinating requests for deviations from requirements and specifications, and ensuring adequate treatment for those deviations;
 - iv) discovering and assessing industry problems which threaten timely and satisfactory achievement of safety objectives related to national requirements, including issuing recommendations for corrective action; and
 - v) witnessing critical tests performed and approving testing methods and test reports.
- d) investigate major problems or defects discovered in aeronautical products or parts in service, and determine appropriate corrective action to be taken, when the airworthiness objectives of national requirements are not being met;
- e) monitor manufacturer's service bulletins (SB) to consider their implications on design, production and maintenance;
- f) evaluate accidents, incidents and service difficulties to determine possible unsatisfactory designs or processes; and
- g) take enforcement action, when necessary, to ensure compliance with airworthiness requirements.

4.5 STAFFING AND TRAINING

4.5.1 General

4.5.1.1 In order to meet its responsibilities, the airworthiness organization must be staffed with qualified, experienced and competent personnel capable of successfully undertaking the wide variety of tasks required in aviation safety oversight. The conditions of service and remuneration should be consistent with their education, technical

knowledge and experience. As a guide, the conditions of service and remuneration should be comparable to airworthiness personnel whose activities they will audit, certificate, and supervise. The CAAs should ensure they attract and retain technically competent personnel with the credibility and competence to interact with industry in an efficient and effective manner. It is essential that the personnel be selected with considerable care. To carry out the functions of certification and oversight, all airworthiness personnel should be appropriately qualified and hold appropriate credentials issued by the State identifying them as experts with unhindered access to inspect aerodromes, aircraft and documents, and the facilities and offices of air operators, AMOs and maintenance training organizations.

4.5.1.2 In addition to the importance of technical competency in performing certification, inspection and surveillance functions, it is critical that inspectors possess a high degree of integrity, be impartial in carrying out their tasks, be tactful, have a good understanding of human nature and possess good communication skills. Considering the specialized and sensitive nature of the CAA inspector's mission, it is vitally important that the qualifications, previous experience and personal characteristics of each person employed, whether directly or on contract, to perform licensing, certification, inspection and surveillance duties be verified and carefully evaluated before selections are made.

4.5.1.3 It is preferable that personnel also possess aeronautical licenses, certificates and/or aeronautical degrees commensurate with their job responsibilities (e.g. engineering degrees, aircraft maintenance license).

4.5.1.4 The State's technical personnel performing certification and surveillance functions on behalf of the State should be at least as qualified as the personnel to be inspected or supervised. Although the CAA aviation inspector should be fully qualified, it is not expected that in all cases any one inspector within the airworthiness organization would possess the same experience as all the personnel being audited. However, the organization, as a team, should have personnel who are knowledgeable, qualified and experienced in the appropriate areas of the organization being inspected.

4.5.1.5 States may determine it is not feasible to maintain a full range of CAA technical personnel to carry out completely the CAA safety oversight function. The State may consider an option to establish a small, technically competent and experienced core of CAA technical personnel. To supplement this experienced CAA unit in carrying out its full safety oversight responsibilities, the CAA may consider entering into an agreement with other States for assistance, on a part-time or cooperative basis. Additionally, the CAA may also consider the employment of a competent commercial organization that would supply the qualified personnel as needed to perform the required inspections in an advisory capacity for the CAA.

Note.— The ICAO Regional Office accredited to the State may be of assistance in working out cooperative inspection arrangements among States in the region.

4.5.1.6 It must be clear that regardless of the arrangements made by a State, it is in no way relieved of the ultimate responsibility for the safe, regular and efficient conduct of aviation within its jurisdiction.

4.5.2 AED staff qualification and experience

An AED staff generally should:

- a) have the relevant knowledge, background and experience related to the design, manufacture and airworthiness certification of aircraft and its related aeronautical products within the scope of the national regulations;
- b) have the proficiency necessary to apply design and manufacture standards relating to the original airworthiness certification of aircraft and component parts to ensure the prototype, modified aircraft or parts meet national airworthiness requirements;

- c) be proficient in the skills necessary to audit manufacturing operations that will ensure compliance with national airworthiness requirements, design specifications and safety standards;
- d) be able to make national airworthiness compliance determinations with regard to manufacturing operations and be able to ensure that the organization conforms to their quality control programme. In making these determinations, the staff member should have prior experience with first article, in process, final assembly inspections, and/or special process functions, e.g., heat treatment, brazing, welding, plating, robotics, software quality control and non-destructive testing; such experience can come from engineering or quality control positions at manufacturing organizations;
- e) be able to make airworthiness determinations and issue initial certificates of airworthiness including export certificates of airworthiness;
- f) have good writing skills in order to communicate clearly in writing any shortcomings detected during certification or surveillance ensuring that timely corrective action is taken; and
- g) have good interpersonal skills to conduct meetings and audits in a fair and professional manner.

4.5.3 AID inspector qualification and experience

An AID inspector generally should:

- a) have the relevant knowledge, background and appropriate experience related to aircraft continuing airworthiness management including:
 - i) aircraft maintenance programme development, approval and control, including applicable reliability programmes;
 - ii) evaluation and approval of modifications and repairs;
 - iii) maintenance release;
 - iv) applicability of MCAI and operational directives with a continuing airworthiness impact;
 - v) correction or deferment of defects;
 - vi) coordination of scheduled maintenance, the application of MCAI, the replacement of life-limited parts and the inspection of components;
 - vii) management of continuing airworthiness records;
 - viii) airworthiness requirements of relevant parts of operations specifications; and
 - ix) knowledge of quality systems;
- b) have experience in the actual performance of maintenance, repair and modification of aircraft, engines and aircraft systems or components in one or a combination of the following:
 - i) AMO;
 - ii) approved air operator maintenance facility;

- iii) approved maintenance training organization;
 - iv) military aircraft repair facility; or
 - v) an appropriate State government agency;
- c) hold an aircraft maintenance license;
- d) have experience in certifying as airworthy aircraft or parts after maintenance has been performed in accordance with national regulations;
- e) have experience with the requirements for issuing a maintenance release for maintenance work performed;
- f) be able to make national airworthiness compliance determinations with regard to the auditing of air operators, AMOs and approved aircraft maintenance training organizations;
- g) have good writing skills in order to communicate in writing any shortcomings detected during certification or surveillance ensuring that timely corrective action is taken; and
- h) have good interpersonal skills to conduct meetings and audits in a fair and professional manner.

4.5.4 Qualification of AID inspectors by academic study

4.5.4.1 Ideally, an AID inspector should be as qualified as the personnel to be inspected or supervised. This is usually accomplished by the inspectors having previous engineering or aircraft maintenance experience. There may be occasions where there is a shortage of such qualified AID inspectors as described in 4.5.3. As an alternative and on a case-by-case basis, AID inspectors may be deemed qualified by the successful completion of a course of relevant academic aeronautical study at a recognized approved training organization or university.

4.5.4.2 To perform their duties adequately it is important that these new inspectors undergo a comprehensive technical on-the-job training programme that provides the inspector with the necessary expertise, experience and skills necessary to perform the tasks required of an AID inspector. The new inspector should be teamed with an experienced inspector who will ensure the on-the-job training is performed and documented. AID inspectors holding academic credentials with no previous aircraft maintenance experience should only be appointed in extraordinary circumstances.

4.5.5 Training requirements

4.5.5.1 The CAA should determine the minimum qualifications for their technical personnel performing safety oversight functions and also provide for their technical training on an initial and recurrent basis. Additionally, periodic practical and specialized technical training including supervisory courses will enable the technical personnel to perform their duties effectively. Training should not be limited to strictly professional elements; technical personnel should receive training on subjects such as applicable CAA regulations, inspector handbooks, auditing techniques, safety management systems (SMS) and quality systems, Human Factors principles, enforcement procedures and topics dealing with advances in aviation technology.

4.5.5.2 The CAA should have an indoctrination programme for induction of new personnel that includes training in:

- a) organizational responsibilities;

- b) appropriate airworthiness standards, practices and policies;
- c) working procedures;
- d) certification and surveillance procedures; and
- e) the role of a regulator.

4.5.5.3 The CAA should have a structured programme to educate the personnel on new CAA requirements, policies and procedures as they are being implemented. To keep personnel abreast of new industry developments a training programme should be developed that provides at regular intervals (initial and recurrent) technical training to gain first-hand knowledge of new developments, including management principles. As a general policy, it is not desirable for CAA personnel to obtain technical qualifications from those entities under their direct regulatory jurisdiction.

4.5.6 On-the-job training

To further ensure a structured training environment a CAA should consider an on-the-job (OJT) training programme that ensures new inspectors are mentored by experienced inspectors in all tasks the inspector is required to perform on behalf of the CAA prior to performing the tasks unaccompanied. The OJT training should be comprehensive and cover the CAA regulations, policies, procedures and current practices. The OJT should allow for the new inspector to observe the experienced inspector actually perform the task. Once this has occurred the new inspector should perform the task being observed and coached by an experienced inspector. Following this the new inspector is debriefed by the experienced inspector. The new inspector then performs the task and is evaluated by an experienced inspector. The new inspector should be evaluated on successfully performing the task in accordance with CAA requirements. The new inspector training records should be updated upon successful completion of each OJT task.

4.5.7 Nomination of AID inspectors

The CAA should have a process to nominate and authorize appropriately qualified technical personnel as inspectors. The process of authorizing an inspector should consider the following:

- a) qualifications of personnel;
- b) training provided (including specialized training); and
- c) OJT completed.

The CAA should issue inspectors with the appropriate credentials (e.g. letter of nomination or authority card) identifying them as technical experts employed by the State authorities, with the right to unhindered access to inspect aircraft, documents and other relevant facilities, as well as normally restricted civil aviation-related sites.

4.6 AIRWORTHINESS ENGINEERING DIVISION (AED) RESPONSIBILITIES

4.6.1 General

4.6.1.1 States with a significant aviation manufacturing industry should establish an airworthiness engineering division (AED) within the CAA airworthiness organization. The size and structure of the AED should be appropriate to

the aviation manufacturing industry and the various types of aircraft on the State's aircraft register. The AED's activity will normally be directed toward design approvals, type certification, manufacturing approvals, evaluations of modifications and repairs proposed by manufacturers, aircraft owners, air operators, and AMOs, to correct deficiencies of aircraft already in service.

4.6.1.2 In States with significant manufacturing activity it may be useful to organize the AED along functional lines by organizing sections dealing with specific technical specialties, such as structures, propulsion, electrical and mechanical systems (including software), certification of production organizations, and surveillance and oversight functions. Furthermore, specialized areas such as non-destructive inspection, plating, welding, software quality assurance and special manufacturing processes should be considered.

4.6.1.3 When the physical size of the State is large and the level of aviation activity is relatively high, it may be necessary to establish regional offices in the proximity of the aviation industry. In such cases, it is necessary that proper lines of communication and responsibility exist between headquarters and regional offices.

4.6.2 Approvals and certificates

The AED should:

- a) approve design organizations and ensure they have the technical competency and organization to enable them to show compliance with the appropriate design requirements and national requirements;
- b) validate or accept aircraft type certificates issued by another State including its components, engines, systems, instruments and equipment;
- c) issue type certificates or design approvals for aircraft, including its components, engines, systems, instruments and equipment;
- d) grant or validate aircraft noise certification;
- e) evaluate and approve modification and repair designs;
- f) issue production certificates or approval for a manufacturer that produces aeronautical products or parts;
- g) amend a production certificate or approval, as necessary;
- h) approve manufacturing organizations and ensure proper communication with the design organization. Ensure the adequacy of manufacturing and test facilities, the competence of skilled personnel, and the existence of satisfactory quality control systems, including coverage of suppliers;
- i) evaluate aircraft for issuance or validation or acceptance and maintenance of type data of aircraft on the register of the State;
- j) issue special flight permits for aircraft that do not meet applicable airworthiness requirements, but are capable of safe flight (e.g. prototype aircraft or production flight tests); and
- k) issue initial certificates of airworthiness for aircraft on the State aircraft register or in preparation for export to another State.

4.6.3 Support of type certification activities

The AED should:

- a) review and process an application for issuance of a type certificate for an aircraft, engine, or propeller, designed or manufactured domestically;
- b) participate in and manage the activities of the type certification board (TCB) as they apply to manufacturing processes and techniques to be used (guidelines for the establishment of a TCB are given in Part V, 2.2.5 of this manual);
- c) inspect prototype aircraft, test specimens and test installation, as necessary. This includes:
 - i) determine the conformity of each part, article and test installation with its applicable design data, as well as with the approved test proposal; and
 - ii) issue conformity inspection reports;
- d) evaluate proposals pertinent to manufacturing aspects of the design, repair and modification of an aircraft or its parts to ensure conformity with CAA specifications; and
- e) support flight preparation.

4.6.4 Continuing airworthiness functions

The AED should:

- a) ensure that a system is in place through which the air operator will report malfunctions, failures, defects and other occurrences that might cause adverse effects on continuing airworthiness to the type design organization. Ensure the type design organization, under its authorization, reviews the reports it receives on malfunctions, failures, defects and other occurrences that might cause adverse effects on continuing airworthiness and takes appropriate corrective action(s) on unsafe conditions, where necessary;
- b) monitor SBs from the manufacturer (both foreign and domestic) to determine likely effects on the continuing airworthiness of aeronautical products and to establish procedures to avoid or correct service difficulties;
- c) mandate actions to correct any unsafe conditions and disseminate the information to all air operators and to CAAs located in States that have the affected aeronautical product on their respective national aircraft register;
- d) ensure that a system is in place for the receipt, review and appropriate action on MCAI from the State of Design;
- e) ensure that a structural integrity programme (SIP) is in place for each aeroplane above 5 700 kg MTOM and monitor its effectiveness with a view to determine the need for supplemental inspections to maintain the aircraft in airworthy condition;
- f) participate in maintenance review board (MRB) activities related to the development and approval of initial maintenance and inspection requirements for newly type certificated aircraft and engines being introduced into service for the first time; and