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Aircraft Maintenance Programs

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David Lapesa Barrera
Zaragoza, Spain

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Preamble

Ever since my early childhood, I have been fascinated with the power of flying. I cannot remember the first time that I watched at the skies and got excited seeing a bird or an aircraft; that is something that I still do, now closer to the airports: just sit and observe the magnificence of the nature and the greatness of what the human being has achieved.

What I can perfectly recall is the first time that I was concerned about flight safety; I was about ten years old, and fortuitously I watched a movie entitled *Alive!* (*¡Viven!* in Spanish) based on the true story of the Fairchild F-27 that crashed on the Andes in 1972. It was a cloudy day and the aircraft repeatedly impacted the mountains, ejecting a few occupants and ending to stop in a glacier. Despite the accident, many occupants survived initially; some died later as a consequence of the crash and a few more during the next days due to an avalanche. The group had to turn to cannibalism in order to survive until they were rescued more than two months later. That horrifying but beautiful survival story still catch my attention.

During my early youth, flying was mostly limited to business trips or people that may afford the expensive ticket prices. Although it may seem rare, it was not until my third year in the Aeronautical University when I actually took my first flight with a low-cost airline, and since then I have never stopped. Flying has given me the chance to know more countries, places, and people than what I could have ever dreamt of.

After a summer internship in the Spanish Air Force, in which I had the opportunity of optimizing a maintenance check of the McDonnell Douglas EF-18, I definitely decided to initiate my professional career focused on the Continuing Airworthiness of the aircraft.

I have worked for four top airlines in Spain, Switzerland, and the Middle East, participating in really interesting projects such as the introduction of the Airbus A220 (the old Bombardier C Series) to the first operator or managing the Aircraft Maintenance Program of the largest Airbus A380 fleet in the world, or ensuring the airworthiness of the latest Airbus produced design, the A350 aircraft.

This book captures the best Aircraft Maintenance Program practices acquired during these years through research, application, and observance of ethical, excellent, and good practices that ensure flight safety, but also recognizing unethical and

poor procedures and behaviors that may compromise it. I came with the idea of the **Triangle of Airworthiness** to explain what are the minimum aircraft criteria to fly safe and the considerations in regards to the **Aircraft Maintenance Programs** to enlarge the triangle in a more cost-effective way.

The book presents a comparison of the applicable EASA and FAA regulations. However, it is fair to recognize the honorable experience and contribution of other authorities to aviation safety, such as the UK Civil Aviation Authority, Transport Canada, the Australian Civil Aviation Safety Authority, and many others. It is also necessary to recognize the efforts of the accident investigation authorities that make an incredible work and which recommendations have significantly contributed to the safety level that we enjoy nowadays on the skies.

Special thanks are owed to the leaders that have given me the opportunity to grow both professionally and personally: Pablo Gestal, as Technical Director of Swiftair, Patrick Scherrer, as the Head of Engineering of Swiss International Airlines, Dolf Beltz, as the VP Engineering Planning and IT Systems at Emirates Airline, and Rafael Martinez, as Technical Director of Evelop (Iberojet).

Thanks to them I have met eminent Maintenance Program experts, the most inspirational mentors, and my role models: Maritza Leon, Lars Schuster, and Gianluca Ropa; and other commanders that brought exciting discussions and projects to the arena: Blanca Escalante, Francisco Javier Ramos, Gerd Eismann, Nick Green, Paul Davies, Andy Jones, Margalida Salis, Angelo Caldeira and Silvia Neves to name a few.

I must be also grateful for the reason that I have had the chance to connect with plenty of other aviation professionals, mates, and friends during my professional journey; although it is not possible to mention all, with affection: Miguel, Elizabeth, Marta, Esperanza, Alemneh, Timo, Joao, Bassem, Julius, Mohsin, Osama, Andrea, Maria, Amin, Arun, Lokesh, Alberto, Luis, ...

I kindly appreciate the organizations that have reviewed and permitted the use of their standards and material in this book, with special allusion to Airlines for America (A4A), the International Civil Aviation Oganization (ICAO) and the International Air Transport Association (IATA).

And last but not least, thanks to my family and lifelong friends for their inspiration and moral support on whatever the plan is.

Zaragoza, Spain David Lapesa Barrera

Introduction

This book details the Aircraft Maintenance Program (AMP) standards and requirements for Large Aircraft involved in Commercial Air Transport operations considering two different ICAO regulatory environments. These two models are chosen due to their significant efforts and contribution to the worldwide air safety: the European Union Aviation Safety Agency (EASA) and the Federal Aviation Administration (FAA).

The Aircraft Maintenance Program is the document that describes the scheduled maintenance tasks and their prescribed frequency that are necessary for the safe operation of the aircraft. The AMP, under the operator responsibility, is a key element to maintain the Continuing Airworthiness of the aircraft, meaning that it remains in a condition for safe operation.

The type of aircraft operation is typically classified attending to aircraft takeoff weight and/or the number of passengers that can be carried on board, and the purposes of the flight.

Large aircraft are those with a maximum certificated takeoff weight of over 5700 kg, and Commercial Air Transport is the operation of aircraft, scheduled or non-scheduled, to transport passengers, cargo or mail for remuneration or hire.

The book includes plenty of examples extracted from aircraft accident/incident investigations in order to understand how they have modeled the regulations through the years and which has been the impact on the AMP requirements.

Lastly, the book presents some tools, techniques, and good practices that may help to improve the quality standards of an AMP.

The Triangle of Airworthiness

The **Triangle of Airworthiness** is a simplified model to understand the processes by which an aircraft and its components are in a safe condition for the operation. The sides of the triangle represent the three elements that are required to keep an aircraft airworthy: Safety, Reliability, and Quality.

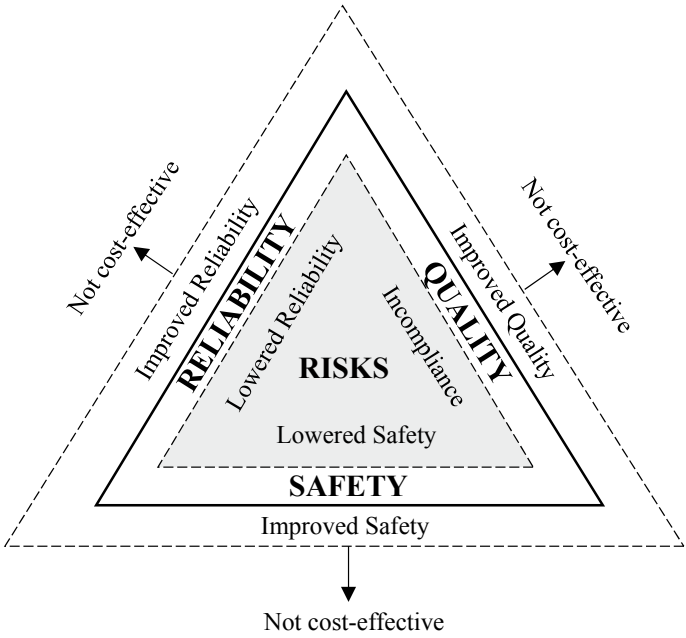

Fig. 1 Triangle of Airworthiness.

Lack of Safety, Reliability, or Quality standards makes the airworthiness level to be inside the Risks triangle (non-acceptable level). This condition is beyond non-compliance; the appearance of risk factors seriously compromises the safe condition of the operations.

On the other side, any added ingredient that inflates the triangle will improve the airworthiness level but may be not cost-effective.

The airworthiness success of the operator is defined by the appropriate balance of the three elements of the triangle (Fig. 1).

Safety refers to reduce the possibility of harming persons or damage property to a level that is acceptable. The safety standards are set internationally by ICAO and implemented through safety programs at two levels: the State Safety Programs (SSP) and the organization Safety Management Systems (SMS). In the case of EASA, there is an intermediary level that is equivalent to the SSP. It is the European Aviation Safety Program (EASP) that aids the member states in developing their own SSPs.

The investigation of occurrences and deviations from the safety standards, which include the investigation of aircraft incidents and accidents, plays one of the most important roles in the safety programs.

The acceptable level of safety is achieved through a continuing process of hazard identification and risk management: appropriate safety culture, occurrence reporting systems, and occurrence investigation. Between these three components, likely the most difficult to achieve is an open safety culture, which is directly related to the

effectiveness of the occurrence reporting systems; some organizations and individuals are still concerned about the implications of reporting, which may be still more pronounced in non-democratic cultures where the safety requirements may be appropiately defined in the organization's Safety Policy and hanging on every wall but not becoming a fact in a "Just Culture" environment. Fortunately, even though the safety culture and the occurrence reporting systems may be deficient, there is a historical work on aircraft accident investigation that has molded the regulations worldwide and made the system more robust.

Reliability refers to the level to which an aircraft or component performs in regards to the intended function given by the design specifications. The reliability level at the design phase is known as Inherent Reliability and can only be transmitted to the manufactured aircraft or component if the Quality functions of the production, Continuing Airworthiness and maintenance organizations are adequate. The target of a Reliability Program is to maintain the Inherent Reliability of the aircraft and its components, what is achieved through an alive and effective Aircraft Maintenance Program. The Inherent Reliability can only be improved through redesign, so an appropriate modification policy is required.

Quality refers to the improvement of the processes that ensure an organization is fit and effective. The minimum acceptable level of quality is compliance with the applicable regulations and standards; the organization is responsible for establishing its own Compliance Monitoring/Quality function to ensure this level is maintained. However, the organization can set higher levels of quality that will definitely be related to the success of what the organization does.

The nexus of the three sides of the Airworthiness Triangle are the **Risks**: the three pillars contribute to the reduction of hazards and are interrelated to each other.

Guidance to Navigate Through the Book

This is a multipurpose book; while the main objective is to raise awareness of the importance of an appropriate and effective Aircraft Maintenance Program to maintain the airworthiness of the aircraft while keeping it cost-effective, it may be read in different ways depending on the objective that the reader is looking for:

– From the regulatory and Technical point of view:

- *Part I Regulatory Environment* presents an introduction to the current EASA and FAA regulatory systems and responsibilities,
- *Part II The Aircraft Maintenance Program—Content and Management* presents the Aircraft Maintenance Program requirements and their sources,
- *Part III The Reliability Program* details the Reliability Program requirements, and
- *Part IV The AMP in the Engineering and Maintenance Organization context* identifies the relations of the Maintenance Programs function with other elements of the organization.

– From the Safety perspective:

  - *Part V Safety Programs* introduces the Safety Programs, including the SMS, and some of the models used to evaluate Human and Organizational Factors.
  - *Part V* complements the "Lessons Learned" boxes found in *Part II* that describe some of the aircraft incident/accident investigations that have modeled the current AMP standards and regulations, and *Appendix II* introduces the aircraft accident investigation processes.

– From the Quality perspective:

  - *Part VI AMP Quality Improvement Tools and Methods* introduces the Compliance Monitoring/Quality function and compiles a series of tools and techniques for the quality improvement of the AMP.
  - *Part II* and *III* also incorporate useful practices to be taken into consideration during the development of the program.

Most of the standards and regulatory requirements quoted have been simplified for better understanding, and therefore DO NOT SUBSTITUTE ANY APPLICABLE STANDARD OR REGULATION. Please, refer to the applicable requirements in the appropriate regulatory environment at the time of developing an approved AMP.

Some concepts considered in this book may be useful with the development of Maintenance Programs for other purposes than commercial operations of large aircraft, such as programs for different aircraft/operation categories or programs required by different industries such as naval, oil, or pharmaceutical Maintenance Programs.

When "competent authority" is referenced, it is the designated body responsible of the subject matter, e.g., the competent authority for the approval of a Type Design is granted by the Certification Authority, e.g. EASA or the FAA; the competent authority for the approval of an AMP is the corresponding ministry or national aviation authority of each EASA member state, as appropriate (FAA does not require the AMP approval, it is part of the Ops Spec); or the competent authority for operational approvals is the corresponding ministry or national aviation authority of each EASA member state or the FAA, as appropriate.

Contents

Acronyms

A4A	Airlines for America
AAIB	Air Accidents Investigation Branch (United Kingdom)
AAIC	Aircraft Accident Investigation Commission (Japan)
AAIP	Approved Aircraft Inspection Program
AAM	Aircraft Asset Management
AAPID	Aviation Accidents Prevention and Investigation Department (Portugal)
AbIR	Airborne Image Recorder
AC	Advisory Circular
ACARS	Aircraft Communication Addressing and Reporting System
AD	Airworthiness Directive or Accidental Damage (refer to the context)
ADREP	Accident/Incident Data Reporting
ADS-B	Automatic Dependent Surveillance Broadcast
AFM	Aircraft Flight Manual
AHM	Aircraft Health Monitoring
AI	Artificial Intelligence
AIBN	Accident Investigation Board Norway
AIDS	Accident/Incident Database System
AIR	Aircraft Inspection Report
ALI	Airworthiness Limitation Item/Inspection
ALS	Airworthiness Limitation
AltMC	Alternative Means of Compliance
AM	Accountable Manager
AMC	Acceptable Means of Compliance
AML	Aircraft Maintenance License
AMM	Aircraft Maintenance Manual
AMOC	Acceptable Means of Compliance
AMP	Aircraft Maintenance Program
ANS	Air Navigation Services
AOA	Angle Of Attack

AOC	Air Operator Certificate
AOG	Aircraft On Ground
AOM	Aerodrome Operating Minima
APU	Auxiliary Power Unit
ARAC	Aviation Rulemaking Advisory Committee
ARC	Airworthiness Review Certificate
ARL	Aircraft Readiness Log
ASA	Aviation Safety Advisory
ASIAS	Aviation Safety Information Analysis and Sharing Program
ASRS	Aviation Safety Reporting System
ATA	Air Transport Association
ATC	Air Traffic Control
ATM	Air Traffic Management
ATS	Air Traffic Services
ATSB	Australian Transport Safety Bureau
AWO	All Weather Operations
BASA	Bilateral Aviation Safety Agreement
BEA	Bureau of Enquiry and Analysis for Civil Aviation Safety (France)
BI	Business Intelligence
BLG	Body Landing Gear
BPMN	Business Process Model and Notation
CA	Certification Authority
CAA	Civil Aviation Authority
CAME	Continuing Airworthiness Management Exposition
CAMMOE	Continuing Airworthiness Management and Maintenance Organization Exposition
CAMO	Continuing Airworthiness Management Organization
CAMP	Continuous Airworthiness Maintenance Program
CAREP	Cabin Report
CASS	Continuing Analysis and Surveillance System
CAT	Commercial Air Transport
CAT I	Category I operation
CAT II	Category II operation
CAT III	Category III operation
CBA	Cost-benefit Analysis
CCMR	Candidate Certification Maintenance Requirement
CDCCL	Critical Design Configuration Control Limitation
CDL	Configuration Deviation List
CENIPA	Aeronautical Accident Investigation and Prevention Center (Brazil)
CFR	Code of Federal Regulations
CG	Centre of Gravity
CGREP	Cargo Report
CLN	Cleaning

CM	Compliance Monitoring
CMCC	Certification Maintenance Coordination Committee
CMM	Component Maintenance Manual
CMP	Configuration, Maintenance and Procedures
CMR	Certification Maintenance Requirement
CMT	Critical Maintenance Task
CoC	Certificate of Conformance
CofA	Certificate of Airworthiness
CPCP	Corrosion Prevention and Control Program
CR	Cancelation Rate
CRD	Comment Response Document
CREEP	Container, Restraints, Energy Absorption, Environment, and Post-crash
CRM	Crew Resource Management
CRS	Certificate of Release to Service
CS	Certification Specifications
CSN	Cycles Since New
CSO	Cycles Since Overhaul
CSR	Cycles Since Repair
CVFDR	Cockpit Voice Flight Data Recorder
CVR	Cockpit Voice Recorder
CWT	Center Wing Fuel Tank
DA	Decision Altitude
DAH	Design Approval Holder
DD	Deferred Defect
DDP	Detail Design Point
DDRS	Documentation Discrepancy Reporting System
DER	Designated Engineer Representative
DET	Detailed Visual Inspection
DH	Decision Height
DIS	Discard
DLR	Data Link Recorder
DMAIC	Define, Measure, Analyze, Improve, and Control
DMC	Direct Maintenance Costs
DME	Distance Measuring Equipment
DOC	Direct Operating Costs
DoI	Date of Installation
DoLA	Date of Last Accomplishment
DoM	Date of Manufacture
DOT	Department Of Transportation
DSG	Design Service Goal
DT	Damage Tolerance
DTE	Damage Tolerant Evaluation
DTI	Damage Tolerant Inspection
EAD	Emergency Airworthiness Directive

EASA	European Union Aviation Safety Agency
EASP	European Aviation Safety Program
ECAST	European Commercial Aviation Safety Team
ECCAIRS	European Coordination Centre for Accident and Incident Reporting Systems
ECM	Engine Condition Monitoring
ECR-ECCAIRS	European Central Repositories for Occurrences
ECR-SRIS	European Central Repository for Safety Recommendations
ED	Environmental Deterioration
EDTO	Extended Diversion Time Operations
EEL	Emergency Equipment Layout
ELT	Emergency Locator Transmitter
EMI	Electromagnetic Interference
EMK	Emergency Medical Kit
EO	Engineering Order
EOL	End Of Lease
ESD	Electrostatic Sensitive Devices
ETOPS	Extended Range Twin-engine Operations/Extended Operations
ETSO	European Technical Standard Order
ETSOA	European Technical Standard Order Authorization
EUR RMA	European Regional Monitoring Agency
EUROCAE	European Organization for Civil Aviation Equipment
EVS	Enhanced Vision System
EWIS	Electrical Wiring Interconnect Systems
EZAP	Enhanced Zonal Analysis Procedure
FAA	Federal Aviation Administration
FAK	First Aid Kit
FAL	Fuel Airworthiness Limitation
FAR	Federal Aviation Regulations
FC	Flight Cycle
FCOM	Flight Crew Operating Manual
FD	Fatigue Damage
FDM	Flight Data Monitoring
FDR	Flight Data Recorder
FEC	Failure Effect Category
FF	First Flight
FH	Flight Hour
FL	Flight Level
FMEA	Failure Mode Effect Analysis
FNC	Functional Check
FNPRM	Further Notice of Proposed Rulemaking
FOQA	Flight Operations Quality Assurance
FQIS	Fuel Quantity Indicating System
FRS	Flammability Reduction System
FTA	Fault Tree Analysis

GLS	GNSS Landing System
GM	Guidance Material
GNSS	Global Navigation Satellite System
GVI	General Visual Inspection
HAZOPS	Hazard and Operability Studies
HFACS	Human Factors Analysis and Classification
HIRF	High Intensity Radiated Field
HPC	High-Pressure Compressor
HPT	High-Pressure Turbine
HT	Hard-time
HUD	Head-Up Display
IATA	International Air Transport Association
ICA	Instructions for Continuing Airworthiness
ICAO	International Civil Aviation Authority
IFSD	In-Flight Shut Down
IFTB	In-Flight Turn Back
IGGS	Inert Gas Generation System
IIC	Investigator in Charge
ILS	Instrument Landing System
IMC	Indirect Maintenance Costs
IMM	Ignition Mitigation Mean
IMPR	Industrial Import Price Index
IMPS	International MRB/MBT Process Standard
IMRBPB	International Maintenance Review Board Policy Board
IOSA	IATA Operational Safety Audit
IP	Issue Paper
IPA	Implementation Procedures for Airworthiness
IPC	Illustrated Parts Catalogue
IR	Implementing Rule
ISARP	IOSA Standards and Recommended Practices
ISC	Industry Steering Committee
ISI	In-Service Information
ISM	IOSA Standards Manual
ISO	International Organization for Standardization
IT	Information Technology
JAA	Joint Aviation Authorities
JAR	Joint Aviation Requirements
JIC	Job Instruction Card
JIT	Just in Time
KPI	Key Performance Indicator
L/HIRF	Lightning/High Intensity Radiated Field
LCI	Labor Cost Index
LDG	Landing
LEP	Life Extension Program
LG	Landing Gear

LHSI	Lightning/HIRF Significant Item
LLP	Life Limited Part
LOPA	Layout Of Passenger Accommodation
LOV	Limit Of Validity
LVO	Low Visibility Operation
LPC	Low-Pressure Compressor
LPT	Low-Pressure Turbine
LROPS	Long Range Operations
LRU	Line Replaceable Unit
LTVO	Low Visibility Takeoff
LUB	Lubrication
LUMP	Low Utilization Maintenance Program
LUR	Low Utilization Recommendations
MAREP	Maintenance Report
MAT	Maintenance Access Terminal
MCAI	Mandatory Continuing Airworthiness Information
MCAS	Maneuvering Characteristics Augmentation System
MCBF	Mean Cycles Between Failures
MCBUR	Mean Cycles Between Unscheduled Removals
MCC	Maintenance Control Center
MCTF	Mean Cycles To Failure
MCTUR	Mean Cycles To Unscheduled Removal
MEDA	Maintenance Error and Decision Aid
MEL	Minimum Equipment List
MLS	Microwave Landing System
MMEL	Master Minimum Equipment List
MNSP	Minimum Navigation Performance Specifications
MOE	Maintenance Organization Exposition
MOR	Maintenance Occurrence Report
MP	Maintenance Programs
MP&S	Maintenance Planning & Scheduling
MPD	Maintenance Planning Document
MPIG	Maintenance Programs Industry Group
MRB	Maintenance Review Board
MRBR	Maintenance Review Board Report
MRM	Maintenance Resource Management
MSG	Maintenance Steering Group
MSI	Maintenance Significant Item
MTB	Maintenance Type Board
MTBF	Mean Time Between Failures
MTBUR	Mean Time Between Unscheduled Removals
MTTF	Mean Time To Failure
MTTR	Mean Time To Repair
MTTUR	Mean Time To Unscheduled Removal
MWG	Maintenance Working Group

NAA	National Aviation Authority
NAARMO	North American Approvals Registry and Monitoring Organization
NASA	National Aeronautics and Space Administration
NDT	Non-Destructive Test
NFFR	No Fault Found Rate
NGS	Nitrogen Generation System
NLG	Nose Landing Gear
NPA	Notice of Proposed Amendment
NPH	Nominated Post Holder
NPRM	Notice of Proposed Rulemaking
NTSB	National Transportation Safety Board (United States)
OC	On-Condition
OCy	Operating Cycles
OEM	Original Equipment Manufacturer
OH	Operating Hours
OMS	On-board Maintenance System
OPC	Operational Check
Ops Spec	Operations Specifications
OR	Operational Reliability
P/N	Part Number
PAD	Proposed Airworthiness Directive
PAP	Protection Assurance Plan
PBE	Performance Breathing Equipment
PBN	Performance Based Navigation
PCU	Power Control Unit
PDCA	Plan, Do, Check, and Act
PEAR	People, Environment, Actions, and Resources
PFMEA	Process Failure Mode Effect Analysis
PHM	Prognostics and Health Management
PIREP	Pilots Report
PMA	Parts Manufacturer Approval
PP&C	Production Planning and Control
PPH	Policy and Procedures Handbook
PPI	Producer Price Index
PSE	Principal Structural Element
QA	Quality
QAR	Quick Access Recorder
QMS	Quality Management System
RCA	Root Cause Analysis
RDAS	Repair Design Approval Sheet
RFID	Radio-Frequency Identification
RII	Required Inspection Item
RMA	Regional Monitoring Agency
RMPIG	Rotorcraft Maintenance Programs Industry Group

RNAV	Area Navigation
RNP	Required Navigation Performance
ROI	Return on Investment
RPA	Robotic Process Automation
RSC	Removable Structural Component
RST	Restoration
RTCA	Radio Technical Commission for Aeronautics
RVR	Runway Visual Range
RVSM	Reduced Vertical Separation Minima
S/N	Serial Number
SAR	Search and Rescue
SARPs	Standards and Recommended Practices
SB	Service Bulletin
SCR	Schedule Completion Rate
SDCPS	Safety Data Collection and Processing Systems
SDI	Special Detailed Inspection
SDR	Service Difficulty Report
SDRS	Service Difficulty Reporting System
SEMR	System Equipment Maintenance Requirement
SF	Severity Factor
SFAR	Special Federal Aviation Regulations
SFI	Safety Performance Indicator
SHELL	Software, Hardware, Environment, and Liveware
SHM	Structural Health Monitoring
SID	Standard Instrument Departure
SIP	Structural Integrity Program
SIPOC	Suppliers, Inputs, Process, Outputs, and Customers
SL	Service Letter
SLA	Service Level Agreement
SM	Safety Manager
SMS	Safety Management System
SOP	Standard Operating Procedure
SR	Success Rate
SRM	Structural Repair Manual
SRS	Safety Reporting System
SSA	System Safety Analysis
SSAD	Sensitive Security Airworthiness Directive
SSD	Significant Standard Differences
SSI	Structural Significant Item
SSID	Supplemental Structural Inspection Document
SSIP	Supplemental Structural Inspection Program
SSP	State Safety Program
SSR	Secondary Surveillance Radar
STAR	Standard Instrument Arrival
STC	Supplemental Type Certificate

STCH	Supplemental Type Certificate Holder
SUP	Suspected Unapproved Part
SVC	Servicing
SWG	Structures Working Group
SWIFT	Structured What-If
SWOT	Strengths, Weaknesses, Opportunities, and Threats
SWPM	Standard Wiring Practices Manual
TC	Type Certificate
TCAS	Traffic Collision Avoidance System
TCH	Type Certificate Holder
TCU	Task Unitary Cost
TDR	Technical Dispatch Reliability
TIP	Technical Implementation Procedures
ToT	Transfer of Title
TP	Technical Publications
TR	Technical Records
TS	Technical Services
TSB	Transport Safety Board (Canada)
TSN	Time Since New
TSO	Technical Standard Order
TSO	Time Since Overhaul
TSOA	Technical Standard Order Authorization
TSR	Time Since Repair
UAV	Unmanned Aerial Vehicle
ULB	Underwater Locator Beacon
Unsch RR	Unscheduled Removal Rate
USOAP	Universal Safety Oversight Program
VA	Validation Authority
VCK	Visual Check
VOR	Very High Frequency (VHF) Omni-Directional Range
VSB	Vendor Service Bulletin
VSM	Value Stream Map
WFD	Widespread Fatigue Damage
WG	Working Group
WI	Work Instruction
WLG	Wing Landing Gear

Part I
Regulatory Environment

Chapter 1
ICAO and the Aviation Authorities

1.1 The International Civil Aviation Organization (ICAO)

The **International Civil Aviation Organization (ICAO)** is an agency of the United Nations that works with (193) member states and industry groups. ICAO has its origin in the Convention on International Civil Aviation signed in Chicago in the 7 December, 1944, known as Chicago Convention. The ICAO prime objective is to develop the international civil aviation in a safe and orderly manner.

ICAO works with the member states and industry groups to reach consensus on international civil aviation **Standards and Recommended Practices (SARPs)** and policies. These SARPs and policies are used by the ICAO Member States to ensure that their local civil aviation operations and regulations conform to global norms. ICAO also issues a series of documents (Docs) for guidance and interpretation of the SARPs.

Member states are required to notify ICAO of any differences that may exist between the national regulations and the ICAO SARPs. These are published in the form of supplements to the SARPs Annexes.

Relevant ICAO SARPS and Docs guidance to the object of study are:

- Annex 6—Operation of Aircraft, Part I—International Air Transport—Aeroplanes[1]
- Annex 8—Airworthiness of Aircraft[2]
  - Doc 9760—Airworthiness Manual[3]
- Annex 19—Safety Management[4]

[1] Annex 6 Operation of Aircraft Part I—International Commercial Air Transport—Aeroplanes. ICAO. Eleventh Edition—July 2018.

[2] Annex 8 Airworthiness of Aircraft. ICAO. Twelfth Edition—July 2018.

[3] Airworthiness Manual (Doc 9760). ICAO. Third Edition—2014.

[4] Annex 19 Safety Management. ICAO. Second Edition—July 2016.

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